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code of federal regulations

Mineral Resources

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703

30

PARTS 0 TO 199
Revised as of July 1, 1982

022-003-94803-1

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Mineral Resources

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Parts 0 to 199

Revised as of July 1, 1982

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I

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thus: 30 CFR 1.1

Explanation

The Code of Federal Regulations is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. The Code is divided into 50 titles which represent broad areas subject to Federal regulation. Each title is divided into chapters which usually bear the name of the issuing agency. Each chapter is further subdivided into parts covering specific regulatory areas.

ISSUE DATES

Each volume of the Code is revised at least once each calendar year and issued on a quarterly basis approximately as follows:

Title 1 through Title 16	as of January 1
Title 17 through Title 27	as of April 1
Title 28 through Title 41	as of July 1
Title 42 through Title 50	as of October 1

The appropriate revision date is printed on the cover of each volume.

LEGAL STATUS

The contents of the Federal Register are required to be judicially noticed (44 U.S.C. 1507). The Code of Federal Regulations is prima facie evidence of the text of the original documents (44 U.S.C. 1510).

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To determine whether a Code volume has been amended since its revision date (in this case, July 1, 1982), consult the "List of CFR Sections Affected (LSA)," which is issued monthly, and the "Cumulative List of Parts Affected," which appears in the Reader Aids section of the daily Federal Register. These two lists will identify the Federal Register page number of the latest amendment of any given rule.

EFFECTIVE AND EXPIRATION DATES

Each volume of the Code contains amendments published in the Federal Register since the last revision of that volume of the Code. Source citations for the regulations are referred to by volume number and page number of the Federal Register and date of publication. Publication dates and effective dates are usually not the same and care must be exercised by the user in determining the actual effective date. In instances where the effective date is beyond the cut-off date for the Code a note has been inserted to reflect the future effective date. In those instances where a regulation published in the Federal Register states a date certain for expiration, an appropriate note will be inserted following the text.

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The Paperwork Reduction Act of 1980 (Pub. L. 96-511) requires Federal agencies to take steps to reduce the Federal paperwork burden for individuals, small businesses and State and local governments, as well as to maximize the usefulness of information collection. One specific requirement of the Act is for Federal agencies to display an OMB control number with the information collection request.

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Provisions that become obsolete before the revision date stated on the cover of each volume are not carried. Code users may find the text of provisions in effect on a given date in the past by using the appropriate numerical list of sections affected. For the period before January 1, 1973, consult either the List of CFR Sections Affected, 1949-1963, or 1964-1972, published in three separate volumes. For the period beginning January 1, 1973, a "List of CFR Sections Affected" is published at the end of each CFR volume.

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What is incorporation by reference? Incorporation by reference was established by statute and allows Federal agencies to meet the requirement to publish regulations in the Federal Register by referring to materials already published elsewhere. For an incorporation to be valid, the Director of the Federal Register must approve it. The legal effect of incorporation by reference is that the material is treated as if it were published in full in the Federal Register (5 U.S.C. 552(a)). This material, like any other properly issued regulation, has the force of law.

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(a) The incorporation will substantially reduce the volume of material published in the Federal Register.

(b) The matter incorporated is in fact available to the extent necessary to afford fairness and uniformity in the administrative process.

(c) The incorporating document is drafted and submitted for publication in accordance with 1 CFR 51.4.

Properly approved incorporations by reference in this volume are listed in the Finding Aids at the end of this volume.

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A subject index to the Code of Federal Regulations is contained in a separate volume, revised annually as of January 1, entitled CFR INDEX AND FINDING AIDS. This volume contains the Parallel Table of Statutory Authorities and Agency Rules (Table I), and Acts Requiring Publication in the Federal Register (Table III). A list of CFR Titles, Chapters, and Parts and an alphabetical list of agencies publishing in the CFR are also included in this volume.

An index to the text of Presidential documents appears at the end of each compilation of Title 3, The President.

The Federal Register Index is issued monthly in cumulative form. This index is based on a consolidation of the "Contents" entries in the daily Federal Register.

A List of CFR Sections Affected (LSA) is published monthly, keyed to the revision dates of the 50 CFR titles.

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JOHN E. BYRNE,
Director,
Office of the Federal Register.

July 1, 1982.

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THIS TITLE

Title 30—Mineral Resources is composed of two volumes. The first volume contains Parts 0—199, and the second volume contains Part 200 to end. The contents of these two volumes represent all current regulations codified under this title of the CFR as of July 1, 1982.

For this volume, Ina C. Masters was Chief Editor. The Code of Federal Regulations is published under the editorial direction of Martha B. Girard, assisted by Robert E. Jordan.

Title 30—Mineral Resources

(This book contains Parts 0 to 199)

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CHAPTER I—Mine Safety and Health Administration, Department of Labor 1

CROSS REFERENCES: Bureau of Land Management, Department of the Interior, regulations with respect to mineral lands: 43 CFR, Chapter II, Subchapter C.

Federal Energy Regulatory Commission, Department of Energy: 18 CFR Chapter 1.

Foreign Trade Statistics, Bureau of the Census, Department of Commerce: 15 CFR Part 30.

Forest Service regulations relating to mineral developments and mining in national forests: 36 CFR Part 251.

General Services Administration regulations for stockpiling of strategic and critical materials: 41 CFR Subchapter C.

General Services Administration regulations with respect to reservation of minerals essential in the production of fissionable material: 41 CFR Part 101-47.

Geological Survey: 30 CFR Chapter II.

Interstate Commerce Commission: 49 CFR Chapter X.

Bureau of Indian Affairs, Department of the Interior, mining regulations: 25 CFR Chapter I, Subchapter P.

NOTE: Other regulations issued by the Department of the Interior appear in Title 18, Chapter IV; Title 25, Chapters I and II; Title 32, Chapter XIII; Title 36, Chapter I; Title 41, Chapter 14; Title 43; and Title 50, Chapters I and IV.

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CHAPTER I—MINE SAFETY AND HEALTH ADMINISTRATION, DEPARTMENT OF LABOR

Former Subchapters A, K, and M were redesignated and transferred to Chapter VI at 39 FR 23997, June 28, 1974.

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1.1 Official emblem.
1.2 Description.
1.3 Use of letters and acronym MSHA.

Authority: Sec. 508, Federal Coal Mine Health and Safety Act of 1969; sec. 301 of Title 5, United States Code; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

Source: 39 FR 23997, June 28, 1974, unless otherwise noted.

Nomenclature Changes: 43 FR 12312, Mar. 24, 1978.

§ 1.1 Official emblem.

The following emblem is established and shall be used as the official emblem of the Mine Safety and Health Administration, except where use of the Departmental Seal is required:

United States Department of Labor
MSHA
Mine Safety and Health Administration

[39 FR 23997, June 28, 1974, as amended at 43 FR 12312, Mar. 24, 1978]

§ 1.2 Description.

The emblem of the Mine Safety and Health Administration is of contemporary design with the letters and acronym of the Administration delineated as MSHA appearing in large letters in the middle of the emblem. Above the letters and acronym appear the words "United States Department of Labor" and below the letters and acronym appear the words "Mine Safety and Health Administration."

[39 FR 23997, June 28, 1974, as amended at 43 FR 12312, Mar. 24, 1978]

§ 1.3 Use of letters and acronym MSHA.

The letters and acronym MSHA may be used and substituted for the words "Mine Safety and Health Administration" in correspondence, rules, regulations, and in certificates of approval, approval plates, labels, and markings prescribed by the Mine Safety and Health Administration to designate and denote equipment, devices, and apparatus approved as "permissible" and suitable for use in mines under the applicable parts of Chapter I of this title, and in such other documents, publications, and pamphlets, and on signs, clothing and uniforms, and offices of the Administration and at such times and locations as may be deemed appropriate by the Assistant Secretary of Labor for Mine Safety and Health.

[39 FR 23997, June 28, 1974, as amended at 43 FR 12312, Mar. 24, 1978]

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Subpart N—Special Use Respirators

11.200 Vinyl chloride respirators; description.
11.201 Required components.
11.202 Gas masks; requirements and tests.
11.203 Chemical-cartridge respirators; requirements and tests.
11.204 Powered air-purifying respirators; requirements and tests.
11.205 Requirements for end-of-service-life indicator.
11.206 Quality control requirements.
11.207 Labeling requirements.
11.208 Fees.

AUTHORITY: Secs. 202(h), 204, and 508, 83 Stat. 763, 764, and 803; 30 U.S.C. 842(h), 844 and 957; secs. 2, 3, and 5, 36 Stat. 370, as amended 37 Stat. 681; 30 U.S.C. 3, 5, and 7; sec. 8(g), 84 Stat. 1600; 29 U.S.C. 657(g); secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803, unless otherwise noted.

SOURCE: 37 FR 6244, Mar. 25, 1972, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12313, Mar. 24, 1978.

Subpart A—General Provisions

§ 11.1 Purpose.

The purpose of the regulations contained in this Part 11 is: (a) To establish procedures and prescribe requirements which must be met in filing applications for joint approval by MSHA and the National Institute for Occupational Safety and Health of respirators or changes or modifications of approved respirators; (b) to establish a schedule of fees to be charged each applicant for the inspections, examinations, and testing conducted by the Institute under the provisions of this part; (c) to provide for the issuance of certificates of approval or modifications of certificates of approval for respirators which have met the applicable construction, performance, and respiratory protection requirements set forth in this part; and (d) to specify minimum requirements and to prescribe methods to be employed by the Institute and by the applicant in conducting inspections, examinations, and tests to determine the effectiveness of respirators used during entry into or escape from hazardous atmospheres.

[37 FR 6243, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.2 Approved respirators and gas masks.

(a) Respirators, combinations of respirators, and gas masks shall be approved for use in hazardous atmospheres where they are maintained in an approved condition and are the same in all respects as those devices for which a certificate of approval has been issued under this part.

(b) Self-contained breathing apparatus, supplied-air respirators and gas masks approved under the former Bureau of Mines approved program shall continue to be accepted for use in hazardous atmospheres according to the schedule set forth below: *Provided* they (1) were fabricated, assembled or built under an approval or any modification thereof issued by the U.S. Bureau of Mines, Department of the Interior; and (2) were purchased on or before the date specified therein; and (3) are maintained in an approved condition according to this part.

Type of device	Use	Bureau of Mines approved devices	Purchased on or before	Approved for use until
Self-contained breathing apparatus	Mine rescue efforts only	Approval Nos. 1303, 1303S, 1307, 13D-14, 13D-15, 13D-16, 13E-25, and 13E-26.	June 30, 1975	Further notice.
	Other than mine rescue as permitted or required by regulation.	Schedule 13 through 13-E devices that are equipped with an audible end of service life indicator.	June 30, 1975	Further notice.
Supplied air respirators	As permitted or required by regulation	Schedule 19B (dated April 19, 1955)	June 30, 1975	March 31, 1980.
Gas Masks	As permitted or required by regulation	Schedule 14F (dated April 23, 1955)	At any time	Further notice.

[44 FR 33068, June 8, 1979]

§ 11.2-1 Selection, fit, use, and maintenance of approved respirators.

In order to insure the maximum amount of respiratory protection, approved respirators shall be selected, fitted, used, and maintained in accordance with the provisions of the American National Standard Practices for Respiratory Protection, Z88.2, obtainable from American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

[37 FR 6244, Mar. 25, 1972. Redesignated at 40 FR 19470, May 5, 1975 and at 44 FR 33068, June 8, 1979]

§ 11.3 Definitions.

As used in this part—

(a) "Air Contamination Level" means the standards of contaminant levels prescribed by the Secretary of Labor in accordance with the provisions of the Occupational Safety and Health Act of 1970 (Pub. L. 91-596; 84 Stat. 1590).

(b) "Applicant" means an individual, partnership, company, corporation, association, or other organization that designs, manufactures, assembles, or controls the assembly of a respirator and who seeks to obtain a certificate of approval for such respirator.

(c) "Approval" means a certificate or formal document issued by MSHA and the Institute stating that an individual respirator or combination of respirators has met the minimum requirements of this Part 11, and that the applicant is authorized to use and attach an approval label to any respirator, respirator container, or instruction card for any respirator manufactured or assembled in conformance with the plans and specifications upon which the approval was based, as evidence of such approval.

(d) "Approved" means conforming to the minimum requirements of this Part 11.

(e) "Auxiliary equipment" means a self-contained breathing apparatus, the use of which is limited in underground mine rescue and recovery operations to situations where the wearer has ready access to fresh air and at least one crew equipped with approved self-contained breathing apparatus of 2 hours or longer rating, is in reserve at a fresh-air base.

(f) "Bureau" means the U.S. Bureau of Mines, Department of the Interior.

(g) "Compressed breathing gas" means oxygen or air stored in a compressed state and supplied to the wearer in gaseous form.

(h) "Concentration limits for radionuclides" means the concentration limits set forth in Appendix B, Table 1, Column I of Title 10 CFR Part 20 by the Nuclear Regulatory Commission.

(i) "dBA" means sound pressure levels in decibels, as measured with the A-weighted network of a standard sound level meter using slow response.

(j) "DOP" means a homogenous liquid aerosol, having a particle diameter of 0.3 micrometer, which is generated by vaporization and condensation of dioctyl phthalate.

(k) "Dust" means a solid mechanically produced particle with a size ranging from submicroscopic to macroscopic.

(l) Respirators "for entry into and escape from" means respiratory devices providing protection during entry into and escape from hazardous atmospheres.

(m) Respirators "for escape only" means respiratory devices providing protection only during escape from hazardous atmospheres.

(n) A "facepiece" or "mouthpiece" is a respirator component designed to provide a gas-tight or dust-tight fit with the face and may include headbands, valves, and connections for canisters, cartridges, filters, or respirable gas source.

(o) "Final inspection" means that activity carried out on a product after all manufacturing and assembly operations are completed to insure completeness and adherence to performance or other specifications, including satisfactory appearance.

(p) "Fume" means a solid condensation particle, generally less than 1 micrometer in diameter.

(q) "Gas" means an aeriform fluid which is in a gaseous state at ordinary temperature and pressure.

(r) "Hazardous atmosphere" means: (1) Any atmosphere containing a toxic or disease producing gas, vapor, dust, fume, mist, or pesticide, either immediately or not immediately dangerous to life or health; or (2) any oxygen-deficient atmosphere.

(s) A "hood" or "helmet" is a respirator component which covers the wearer's head and neck, or head, neck, and shoulders, and is supplied with incoming respirable air for the wearer to breathe. It may include a headharness and connection for a breathing tube.

(t) "Immediately dangerous to life or health" means conditions that pose an immediate threat to life or health or conditions that pose an immediate threat of severe exposure to contaminants, such as radioactive materials, which are likely to have adverse cumulative or delayed effects on health.

(u) "Incoming inspection" means the activity of receiving, examining, and accepting only those materials and parts whose quality conforms to specification requirements.

(v) "In-process inspection" means the control of products at the source of production and at each step of the manufacturing process, so that departures from specifications can be corrected before defective components or materials are assembled into the finished product.

(w) "Institute" means the National Institute for Occupational Safety and Health, Department of Health and Human Services.

(x) "Liquefied breathing gas" means oxygen or air stored in liquid form and supplied to the wearer in a gaseous form.

(y) "Mist" means a liquid condensation particle with a size ranging from submicroscopic to macroscopic.

(z) "Not immediately dangerous to life or health" means any hazardous atmosphere which may produce physical discomfort immediately, chronic poisoning after repeated exposure, or acute adverse physiological symptoms after prolonged exposure.

(aa) "Oxygen deficient atmosphere" means an atmosphere which contains an oxygen partial pressure of less than 148 millimeters of mercury (19.5 percent by volume at sea level).

(bb) "Pesticide" means (1) any substance or mixture of substances (including solvents and impurities) intended to prevent, destroy, repel, or mitigate any insect, rodent, nematode, fungus, weed, or other form of plant or animal life or virus, and (2) any substance or mixture of substances (including solvents and impurities) intended for use as a plant regulator, defoliant, or desiccant, as defined in the Federal Insecticide, Fungicide, and Rodenticide Act of 1947, as amended (7 U.S.C. 135-135k), excluding fumigants which are applied as gases or vapors or in a solid or liquid form as pellets or poured liquids for subsequent release as gases or vapors.

(cc) "Powered air-purifying respirator" means a device equipped with a facepiece, hood, or helmet, breathing tube, canister, cartridge, filter, canister with filter, or cartridge with filter, and a blower.

(dd) "Radionuclide" means an atom identified by the constitution of its nucleus (specified by the number of protons Z, number of neutrons N, and energy, or, alternatively, by the atomic number Z, mass number $A=(N+Z)$, and atomic mass) which exists for a measurable time; decays or disintegrates spontaneously, emits radiation, and results in the formation of new nuclides.

(ee) "Respirable dust" means dust collected with a sampling device approved by the Secretary and the Secretary of Health and Human Services in accordance with Part 74 (Coal Mine Dust Personal Sampler Units) of this title. Sampling device approvals issued by the Secretary of the Interior and Secretary of Health, Education, and Welfare are continued in effect.

(ff) "Respirator" means any device designed to provide the wearer with respiratory protection against inhalation of a hazardous atmosphere.

(gg) "Smoke" means the products of incomplete combustion of organic substances in the form of solid and liquid particles and gaseous products in air, usually of sufficient concentration to perceptibility obscure vision.

(hh) "Testing and Certification Laboratory" means the Testing and Certification Laboratory, National Institute for Occupational Safety and Health, 944 Chestnut Ridge Road, Morgantown, WV 26505.

(ii) "Vapor" means the gaseous state of a substance that is solid or liquid at ordinary temperature and pressure.

(jj) "MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to March 9, 1978.

(kk) "Single-use Respirator" means a respirator that is entirely discarded after excessive resistance, sorbent exhaustion, or physical damage renders it unsuitable for further use.

(ll) "MSHA" means the U.S. Department of Labor, Mine Safety and Health Administration.

(Sec. 101, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811)

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973; 39 FR 39039, Nov. 5, 1974; 42 FR 65167, Dec. 30, 1977; 43 FR 12313, Mar. 24, 1978; 43 FR 43458, Sept. 26, 1978; 45 FR 24004, Apr. 8, 1980; 47 FR 28095, June 29, 1982]

§ 11.4 Incorporation by reference.

In accordance with 5 U.S.C. 552(a)(1), the technical publications to which reference is made in this Part 11, and which have been prepared by organizations other than MSHA or the Institute, are hereby incorporated by reference and made a part hereof. The incorporated technical publications are available for examination at Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, and at the Testing and Certification Laboratory. In addition, copies of the American National Standards Institute Standard Z88.2-1969, "Practices for Respiratory Protection," are available for examination in every Coal Mine Health and Safety District and Subdistrict Office.

[38 FR 6993, Mar. 15, 1973, as amended at 39 FR 39039, Nov. 5, 1974; 43 FR 12313, Mar. 24, 1978]

Subpart B—Application for Approval

§ 11.10 Application procedures.

(a) Inspection, examination, and testing leading to the approval of the types of respirators classified in Subpart F of this part shall be undertaken by the Institute only pursuant to written applications which meet the minimum requirements set forth in this Subpart B.

(b) Applications shall be submitted to the Testing and Certification Laboratory, and shall be accompanied by a check, bank draft, or money order in the amount specified in Subpart C of this part payable to the order of the National Institute for Occupational Safety and Health.

(c) Except as provided in § 11.64 and in paragraph (e) of this section, the examination, inspection, and testing of all respirators shall be conducted by the Testing and Certification Laboratory.

(d) Applicants, manufacturers, or their representatives may visit or communicate with the Testing and Certification Laboratory in order to discuss the requirements for approval of any respirator or the proposed designs thereof. No charge shall be made for such consultation and no written report shall be issued to applicants, manufacturers, or their representatives by the Institute as a result of such consultation.

(e) Inspection, examination, and testing of electrical components of respirators that are required to be permissible shall be tested in accordance with Part 18 of this chapter, and such components shall be submitted to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059.

OMB CONTROL No. 1219-0066. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[38 FR 6993, Mar. 15, 1973, as amended at 43 FR 12313, Mar. 24, 1978; 47 FR 14696, Apr. 6, 1982]

§ 11.11 Contents of application.

(a) Each application for approval shall contain a complete written description of the respirator for which approval is requested together with drawings and specifications (and lists thereof) showing full details of construction of the respirator and of the materials used. Drawings and specifications (and lists thereof) shall be submitted in triplicate.

(b) Drawings shall be titled, numbered, and dated; any revision dates shall be shown on the drawings, and the purpose of each revision being sought shall be shown on the drawing or described on an attachment to the drawing to which it applies.

(c) Each application for approval shall contain a proposed plan for quality control which meets the minimum requirements set forth in Subpart E of this part.

(d) Each application shall contain a statement that the respirator has been pretested by the applicant as prescribed in § 11.64, and shall include the results of such tests.

(e) Each application for approval shall contain a statement that the respirator and component parts submitted for approval are either (1) prototypes, or (2) made on regular production tooling, with no operation included which will not be incorporated in regular production processing.

§ 11.12 Delivery of respirators and components by applicant; requirements.

(a) Each applicant shall, when an application is filed pursuant to § 11.10, be advised by the Institute of the total number of respirators and component parts required for testing.

(b) The applicant shall deliver, at his own expense, the number of completely assembled respirators and component parts required for testing, to Testing and Certification Laboratory.

(c) Respirators and component parts submitted for approval must be made from materials specified in the application.

(d) One completely assembled respirator approved under the provisions of this part may be retained by the Institute as a laboratory exhibit, the remaining respirators may be returned to the applicant at his own expense, upon written request within 30 days after notice of approval. If no such request is made, the respirators will be disposed of by the Institute in such manner as it deems appropriate.

(e) Where a respirator fails to meet the requirements for approval set forth in this part, all respirators and components delivered in accordance with this section may be returned to the applicant at his own expense, upon written request within 30 days after notice of disapproval. If no such request is made, the respirators will be disposed of by the Institute in such manner as it deems appropriate.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

Subpart C—Fees

§ 11.20 Examination, inspection and testing of complete respirator assemblies; fees.

Except as provided in § 11.22, the following fees shall be charged by the Institute for the examination, inspection and testing of complete respirator assemblies:

(a) Self-contained breathing apparatus—	
(1) Entry and escape, 1 hour or more	$3,500
(2) Entry and escape, less than 1 hour	2,750
(3) Escape only	2,000
(b) Gas masks, including pesticide gas masks—	
(1) Single hazard	$1,100
(2) Type N	4,100
(c) Supplied-air respirators	750
(d) Dust, fume and mist respirators—	
(1) Single particulate hazard having an Air Contamination Level more than 0.05 mg./m.^{3} or 2 million particles per cubic foot	500
(2) Combination particulate hazards having an Air Contamination Level more than 0.05 mg./m.^{3} or 2 million particles per cubic foot	750
(3) Particulate hazards having an Air Contamination Level less than 0.05 mg./m.^{3} or 2 million particles per cubic foot, radon daughters.	1,250
(4) All dusts, fumes and mists	2,000
(e) Chemical cartridge respirators	1,150
(f) Paint spray respirators	1,600
(g) Pesticide respirators	1,600

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.21 Examination, inspection and testing of respirator components or subassemblies; fees.

Except as provided in § 11.22, the following fees shall be charged by the Institute for the examination, inspection and testing of the individual respirator components or subassemblies:

(a) Facepieces	$450
(b) Canisters	900
(c) Cartridges	600
(d) Filters	650

(e) Hoses	250
(f) Blowers	250
(g) Harnesses	100

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.22 Unlisted fees; additional fees; payment by applicant prior to approval.

(a) Applications for the examination, inspection and testing of complete respirator assemblies which are not listed in § 11.20, or for the examination, inspection, and testing of respirator components or subassemblies which are not listed in § 11.21, shall be accompanied by the following deposits:

(1) Complete respirator assembly	$1,500
(2) Each individual component or subassembly	500

(b) MSHA and the Institute reserve the right to conduct any examination, inspection or test they deem necessary to determine the quality and effectiveness of any listed or unlisted respirator assembly or respirator component or subassembly, and to assess the cost of such examinations, inspections, or tests against the applicant prior to the issuance of any approval for such assembly, component, or subassembly.

(c) The fees charged for the examination, inspection, and testing of unlisted respirator assemblies, unlisted individual respirator components or subassemblies, and for the additional examination, inspection, and testing of listed respirator assemblies and components or subassemblies shall be at the rate of $100 per day for each manday required to be expended by the Institute.

(d) Upon completion of all examinations, inspections, and tests of unlisted respirator assemblies or components, or following the completion of any additional examination, inspections, or tests of listed assemblies, or components or subassemblies, including retesting subsequent to disapproval, the Institute shall advise the applicant in writing of the total cost assessed and the additional amount, if any, which must be paid to the Institute as a condition of approval.

(e) In the event the amount assessed by the Institute for unlisted assemblies, or components or subassemblies is less than the amount of the deposit submitted in accordance with paragraph (a) of this section, the Institute shall refund the overpayment upon the issuance of any approval or notice of disapproval.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

Subpart D—Approval and Disapproval

§ 11.30 Certificates of approval; scope of approval.

(a) MSHA and the Institute shall issue certificates of approval pursuant to the provisions of this subpart only for individual, completely assembled respirators which have been examined, inspected, and tested, and which meet the minimum requirements set forth in Subparts H through M of this part, as applicable.

(b) MSHA and the Institute will not issue certificates of approval for any respirator component or for any respirator subassembly.

(c) MSHA and the Institute shall not issue an informal notification of approval. However, if the application for approval, submitted in accordance with § 11.11, states that the submitted respirator and component parts are only prototypes, the Institute will examine, inspect, and test such respirator and component parts in accordance with the provisions of this Part 11. If, upon completion of such examinations, inspections and tests, it is found that the prototype meets the minimum requirements set forth in this part, MSHA and the Institute may inform the applicant, in writing, of the results of the examinations, inspections, and tests, and may require him to resubmit respirators and component parts made on regular production tooling, with no operations included which will not be incorporated in regular production processing, for further examination, inspection, and testing, prior to issuance of the certificate of approval.

(d) Applicants required to resubmit respirators and component parts made on regular production tooling, with no operation included which will not be incorporated in regular production processing, shall be charged fees in accordance with Subpart C of this part.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6994, Mar. 15, 1973]

§ 11.31 Certificates of approval; contents.

(a) The certificate of approval shall contain a classification and a description of the respirator or combination of respirators for which it is issued, as provided in this part.

(b) The certificate of approval shall specifically set forth any restrictions or limitations on the respirator's use in hazardous atmospheres.

(c) Each certificate of approval shall be accompanied by the drawings and specifications (and lists thereof) submitted by the applicant in accordance with § 11.11. These drawings and specifications shall be incorporated by reference in the certificate of approval, and shall be maintained by the applicant. The drawings and specifications listed in each certificate of approval shall set forth in detail the design and construction requirements which shall be met by the applicant during commercial production of the respirator.

(d) Each certificate of approval shall be accompanied by a reproduction of the approval label design to be employed by the applicant with each approved respirator, as provided in § 11.33.

(e) No test data or specific laboratory findings will accompany any certificate of approval, however, MSHA or the Institute will release pertinent test data and specific findings upon written request by the applicant, or as required by statute or regulation.

(f) Each certificate of approval shall also contain the approved quality control plan as specified in § 11.42.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6994, Mar. 15, 1973]

§ 11.32 Notice of disapproval.

(a) If, upon the completion of the examinations, inspections, and tests required to be conducted in accordance with the provisions of this part, it is found that the respirator does not meet the minimum requirements set forth in this part, MSHA and the Institute shall issue a written notice of disapproval to the applicant.

(b) Each notice of disapproval shall be accompanied by all pertinent data or findings with respect to the defects of the respirator for which approval was sought with a view to the possible correction of any such defects.

(c) MSHA and the Institute shall not disclose, except to the applicant or as required by statute or regulation, any data, findings, or other information with respect to any respirator for which a notice of disapproval is issued.

§ 11.33 Approval labels and markings; approval of contents; use.

(a) Full-scale reproductions of approval labels and markings, and a sketch or description of the method of application and position on the harness, container, canister, cartridge, filter, or other component, together with instructions for the use and maintenance of the respirator shall be submitted to MSHA and the Institute for approval.

(b) Approval labels shall bear the emblem of the Mine Safety and Health Administration and the seal of the Department of Health and Human Services, the applicant's name and address, an approval number assigned by the Institute, and, where appropriate, restrictions or limitations placed upon the use of the respirator by MSHA and the Institute. The approval number assigned by the Institute shall be designated by the prefix TC and a serial number.

(c) MSHA and the Institute shall, where necessary, notify the applicant when additional labels, markings, or instructions will be required.

(d) Approval labels and markings shall only be used by the applicant to whom they were issued.

(e) Legible reproductions or abbreviated forms of the label approved by MSHA and the Institute for use on each respirator shall be attached to or printed at the following locations:

Respirator type	Label type	Location
Self-contained breathing apparatus.	Entire	Harness assembly and canister (where applicable).
Gas mask	Entire	Mask container and canister.
Supplied air respirator	Entire	Respirator container or instruction card.
Dust, fume, and mist respirator	Entire	Respirator container and filter container.
	Abbreviated	Filters.
Chemical-cartridge respirator, including paint spray respirator	Entire	Respirator container, cartridge container, and filter containers (where applicable).
	Abbreviated	Cartridges and filters and filter containers.
Pesticide respirator	Entire	Respirator container, and cartridge and filter containers.
	Abbreviated	Cartridges and filters.

(f) The use of any MSHA and Institute approval label obligates the applicant to whom it is issued to maintain or cause to be maintained the approved quality control sampling schedule and the acceptable quality level for each characteristic tested, and to assure that it is manufactured according to the drawings and specifications upon which the certificate of approval is based.

(g) Each respirator, respirator component, and respirator container shall, as required by MSHA and the Institute to assure quality control and proper use of the respirator, be labeled distinctly to show the name of the applicant, and the name and letters or numbers by which the respirator or respirator component is designated for trade purposes, and the lot number, serial number, or approximate date of manufacture.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6994, Mar. 15, 1973; 39 FR 39040, Nov. 5, 1974; 47 FR 28095, June 29, 1982]

§ 11.34 Revocation of certificates of approval.

MSHA and the Institute reserve the right to jointly revoke, for cause, any certificate of approval issued pursuant to the provisions of this part. Such causes include, but are not limited to, misuse of approval labels and markings, misleading advertising, and failure to maintain or cause to be maintained the quality control requirements of the certificate of approval.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6994, Mar. 15, 1973]

§ 11.35 Changes or modification of approved respirators; issuance of modification of certificate of approval.

(a) Each applicant may, if he desires to change any feature of an approved respirator, request a modification of the original certificate of approval issued by MSHA and the Institute for such respirator by filing an application for such modification in accordance with the provisions of this section.

(b) Applications shall be submitted as for an original certificate of approval, with a request for a modification of the existing certificate to cover any proposed change.

(c) The application shall be accompanied by appropriate drawings and specifications, and by a proposed quality control plan which meets the requirements of Subpart E of this part.

(d) The application for modification together with the accompanying material, shall be examined by the Institute to determine whether testing will be required.

(e) The Institute shall inform the applicant of the fee required for any additional testing and the applicant will be charged for the actual cost of any examination, inspection, or test required, and such fees shall be submitted in accordance with the provisions of Subpart C of this part.

(f) If the proposed change or modification meets the requirements of this part, a formal certificate of modification will be issued, accompanied, where necessary, by a list of new and revised drawings and specifications covering the change(s) and reproductions of revised approval labels.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.36 Delivery of changed or modified approved respirator.

An approved respirator for which a formal certificate of modification has been issued shall be delivered, with proper markings and containers, by the applicant to the Testing and Certification Laboratory, as soon as it is commercially produced.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

Subpart E—Quality Control

§ 11.40 Quality control plans, filing requirements.

As a part of each application for approval or modification of approval submitted pursuant to this part, each applicant shall file with MSHA and the Institute a proposed quality control plan which shall be designed to assure the quality of respiratory protection provided by the respirator for which approval is sought.

§ 11.41 Quality control plans; contents.

(a) Each quality control plan shall contain provisions for the management of quality, including: (1) Requirements for the production of quality data and the use of quality control records; (2) control of engineering drawings, documentations, and changes; (3) control and calibration of measuring and test equipment; (4) control of purchased material to include incoming inspection; (5) lot identification, control of processes, manufacturing, fabrication, and assembly work conducted in the applicant's plant; (6) audit of final inspection of the completed product; and, (7) the organizational structure necessary to carry out these provisions.

(b) Each provision for incoming and final inspection in the quality control plan shall include a procedure for the selection of a sample of respirators and the components thereof for testing, in accordance with procedures set forth in Military Standard MIL-STD-105D, "Sampling Procedures and Tables for Inspection by Attributes," or Military Standard MIL-STD-414, "Sampling Procedures and Tables for Inspection by Variables for Percent Defective," or an approved equivalent sampling procedure, or an approved combination of sampling procedures. Incoming bulk raw material inspection or verification of specification, and in-process inspection shall be sufficient to ensure control of product quality through the manufacturing cycle.

(c) The sampling procedure shall include a list of the characteristics to be tested by the applicant or his agent.

(d) The characteristics listed in accordance with paragraph (c) of this section shall be classified according to the potential effect of such defect and grouped into the following classes:

(1) *Critical.* A defect that judgment and experience indicate is likely to result in a condition immediately hazardous to life or health for individuals using or depending upon the respirator;

(2) *Major A.* A defect, other than critical, that is likely to result in failure to the degree that the respirator does not provide any respiratory protection, or a defect that reduces protection and is not detectable by the user;

(3) *Major B.* A defect, other than Major A or critical, that is likely to result in reduced respiratory protection, and is detectable by the user; and

(4) *Minor.* A defect that is not likely to materially reduce the usability of the respirator for its intended purpose, or a defect that is a departure from established standards and has little bearing on the effective use or operation of the respirator.

(e) The quality control inspection test method to be used by the applicant or his agent for each characteristic required to be tested shall be described in detail.

(f) Each item manufactured shall be 100 percent inspected for defects in all critical characteristics and all defective items shall be rejected.

(g) The Acceptable Quality Level (AQL) for each major or minor defect so classified by the applicant shall be:

(1) *Major A.* 1.0 percent;

(2) *Major B.* 2.5 percent; and

(3) *Minor* 4.0 percent.

(h) Except as provided in paragraph (i) of this section, inspection level II as described in MIL-STD-105D, or inspection level IV as described in MIL-STD-414, shall be used for major and minor characteristics and 100 percent inspection for critical characteristics.

(i) Subject to the approval of MSHA and the Institute, where the quality control plan provisions for raw material, processes, manufacturing, and fabrication inspection are adequate to insure control of finished article quality, destructive testing of finished articles may be conducted at a lower level of inspection than that specified in paragraph (h) of this section.

§ 11.42 Proposed quality control plans; approval by MSHA and the Institute.

(a) Each proposed quality control plan submitted in accordance with this subpart shall be reviewed by MSHA and the Institute to determine its effectiveness in insuring the quality of respiratory protection provided by the respirator for which an approval is sought.

(b) If MSHA and the Institute determine that the proposed quality control plan submitted by the applicant will not insure adequate quality control, MSHA and the Institute shall require the applicant to modify the procedures and testing requirements of the plan prior to approval of the plan and issuance of any certificate of approval.

(c) Approved quality control plans shall constitute a part of and be incorporated into any certificate of approval issued by MSHA and the Institute, and compliance with such plans by the applicant shall be a condition of approval.

§ 11.43 Quality control records; review by MSHA and the Institute; revocation of approval.

(a) The applicant shall keep quality control inspection records sufficient to carry out the procedures required in MIL-STD-105D or MIL-STD-414, or an approved equivalent sampling procedure.

(b) MSHA and the Institute reserve the right to have their representatives inspect the applicant's quality control test methods, equipment, and records, and to interview any employee or agent of the applicant in regard to quality control test methods, equipment, and records.

(c) MSHA and the Institute reserve the right to jointly revoke, for cause any certificate of approval where it is found that the applicant's quality control test methods, equipment, or records do not insure effective quality control over the respirator for which the approval was issued.

Subpart F—Classification of Approved Respirators; Scope of Approval; Atmospheric Hazards; Service Time

§ 11.50 Types of respirators to be approved; scope of approval.

Approvals shall be issued for the types of respirators which have been classified pursuant to this Subpart F, have been inspected, examined and tested by the Institute, in accordance with the provisions of Subparts G through M of this part, and have been found to provide respiratory protection for fixed periods of time against the hazards specified in such approval.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.51 Entry and escape, or escape only; classification.

Respirators described in Subparts H through M of this part shall be classified for use as follows:

(a) *Entry and escape.* Respirators designed and approved for use during entry into a hazardous atmosphere, and for escape from a hazardous atmosphere; or,

(b) *Escape only.* Respirators designed and approved for use only during escape from a hazardous atmosphere.

§ 11.52 Respiratory hazards; classification.

Respirators described in Subparts H through M of this part shall be classified as approved for use against any or all of the following respiratory hazards:

(a) Oxygen deficiency;

(b) Gases and vapors;

(c) Particles, including dusts, fumes and mists; and

(d) Pesticides.

§ 11.53 Service time; classification.

(a) Respirators described in Subparts H through M of this part shall be classified, where applicable, as approved for use during the following prescribed service times:

(1) Four hours;

(2) Three hours;

(3) Two hours;

(4) One hour;

(5) Forty-five minutes;
(6) Thirty minutes;
(7) Fifteen minutes;
(8) Ten minutes;
(9) Five minutes;
(10) Three minutes.

(b) Other service times may be prescribed by the Institute.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

Subpart G—General Construction and Performance Requirements

§ 11.60 Construction and performance requirements; general.

(a) MSHA and the Institute shall issue approvals for the types of respirators described in Subparts H through M of this part which have met the minimum requirements set forth for such respirators in this Part 11.

(b) In addition to the types of respirators specified in Subparts H through M, MSHA and the Institute shall issue approvals for other respiratory protective devices not specifically described in this Part 11 subject to such additional requirements as may be imposed in accordance with § 11.63(c).

§ 11.61 General construction requirements.

(a) Respirators will not be accepted by the Institute for examination, inspection and testing unless they are designed on sound engineering and scientific principles, constructed of suitable materials and evidence good workmanship.

(b) Respirator components which come into contact with the wearer's skin shall be made of nonirritating materials.

(c) Components replaced during or after use shall be constructed of materials which will not be damaged by normal handling.

(d) Mouthpieces, hoods, helmets, and facepieces, except those employed in single-use respirators, shall be constructed of materials which will withstand repeated disinfection as recommended by the applicant in his instructions for use of the device.

(e) The components of each respirator approved by MSHA and the Institute for use where permissibility is required shall meet the requirements for permissibility and intrinsic safety set forth in Part 18, Subchapter D of this chapter (Bureau of Mines Schedule 2G).

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.62 Component parts; minimum requirements.

(a) The component parts of each respirator shall be:

(1) Designed, constructed, and fitted to insure against creation of any hazard to the wearer;

(2) Assembled to permit easy access for inspection and repair of functional parts; and

(3) Assembled to permit easy access to parts which require periodic cleaning and disinfecting.

(b) Replacement parts shall be designed and constructed to permit easy installation and to maintain the effectiveness of the respirator.

§ 11.63 Test requirements; general.

(a) Each respirator and respirator component shall when tested by the applicant and by the Institute, meet the applicable requirements set forth in Subparts H through M of this part.

(b) Where a combination respirator is assembled from two or more types of respirators, as described in this part, each of the individual respirator types which have been combined shall, as applicable, meet the minimum requirements for such respirators set forth in Subparts H through M of this part, and such combination respirators, except as specified in § 11.70(b)(2), will be classified by the type of respirator in the combination which provides the least protection to the user.

(c) In addition to the minimum requirements set forth in Subparts H through M of this part, MSHA and the Institute reserve the right to require, as a further condition of approval, any additional requirements deemed necessary to establish the quality, effectiveness, and safety of any respirator used as protection against hazardous atmospheres.

(d) Where it is determined after receipt of an application that additional requirements will be required for approval, the Institute will notify the applicant in writing of these additional requirements, and necessary examinations, inspections, or tests, stating generally the reasons for such requirements, examinations, inspections, or tests.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.64 Pretesting by applicant; approval of test methods.

(a) Prior to making or filing any application for approval or modification of approval, the applicant shall conduct, or cause to be conducted, examinations, inspections, and tests of respirator performance which are equal to or exceed the severity of those prescribed in this part.

(b) With the application, the applicant shall provide a statement to the Institute showing the types and results of the examinations, inspections, and tests required under paragraph (a) of this section and state that the respirator meets the minimum requirements of Subparts H through M of this part, as applicable. Complete examination, inspection, and test data shall be retained on file by the applicant and be submitted, upon request, to the Institute.

(c) The Institute may, upon written request by the applicant, provide drawings and descriptions of its test equipment and otherwise assist the applicant in establishing a test laboratory or securing the services of a testing agency.

(d) No approval will be issued until the Institute has validated the applicant's test results.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.65 Conduct of examinations, inspections, and tests by MSHA and the Institute; assistance by applicant; observers; recorded data; public demonstrations.

(a) All examinations, inspections, and tests conducted pursuant to Subparts H through M of this part will be under the sole direction and control of MSHA and the Institute.

(b) MSHA and the Institute may, as a condition of approval, require the assistance of the applicant or agents of the applicant during the assembly, disassembly, or preparation of any respirator or respirator component prior to testing or in the operation of such equipment during testing.

(c) Only MSHA and Institute personnel, persons assisting MSHA pursuant to paragraph (b) of this section, and such other persons as are requested by MSHA, the Institute, or the applicant to be observers, shall be present during any examination, inspection, or test conducted prior to the issuance of an approval by MSHA and the Institute for the equipment under consideration.

(d) MSHA and the Institute shall hold as confidential any analyses, drawings, specifications, or materials submitted by the applicant and shall not disclose any principles or patentable features of such equipment, except as required by statute or regulation.

(e) As a condition of each approval issued for any respirator, MSHA and the Institute reserve the right, following the issuance of such approval, to conduct such public tests and demonstrations of the approved respiratory equipment as is deemed appropriate.

§ 11.66 Withdrawal of applications; refund of fees.

(a) Any applicant may, upon a written request submitted to MSHA or the Institute, withdraw any application for approval of any respirator.

(b) Upon receipt of a written request for the withdrawal of an application, the Institute shall determine the total man-days expended and the amount due for services already performed during the course of any examinations, inspections, or tests conducted pursuant to such application. The total amount due shall be determined in accordance with the provisions of § 11.22 and assessed against the fees submitted by the applicant. If the total amount assessed is less than the fees submitted, the Institute shall refund the balance together with a statement of the charges made for services rendered.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

Subpart H—Self-Contained Breathing Apparatus

§ 11.70 Self-contained breathing apparatus; description.

(a) Self-contained breathing apparatus, including all completely assembled, portable, self-contained devices designed for use as respiratory protection during entry into and escape from or escape only from hazardous atmospheres, are described as follows:

(1) *Closed-circuit apparatus.* An apparatus of the type in which the exhalation is rebreathed by the wearer after the carbon dioxide has been effectively removed and a suitable oxygen concentration restored from sources composed of:

(i) Compressed oxygen; or

(ii) Chemical oxygen; or

(iii) Liquid-oxygen.

(2) *Open-circuit apparatus.* An apparatus of the following types from which exhalation is vented to the atmosphere and not rebreathed:

(i) *Demand-type apparatus.* An apparatus in which the pressure inside the facepiece in relation to the immediate environment is positive during exhalation and negative during inhalation.

(ii) *Pressure-demand-type apparatus.* An apparatus in which the pressure inside the facepiece in relation to the immediate environment is positive during both inhalation and exhalation.

(b) The following respirators may be classified as designed and approved for use during emergency entry into a hazardous atmosphere: A combination respirator which includes a self-contained breathing apparatus and a Type "C" or Type "CE" supplied air respirator, where (1) the self-contained breathing apparatus is classified for 3-, 5-, or 10-minute service time and the air line supply is used during entry, or (2) the self-contained breathing apparatus is classified for 15 minutes or longer service time and not more than 20 percent of the rated capacity of the air supply is used during entry.

(c) Self-contained breathing apparatus classified for less than 1 hour service time will not be approved for use during underground mine rescue and recovery operations except as auxiliary equipment.

(d) Self-contained breathing apparatus classified for less than 30 minutes' service time will not be approved for use as auxiliary equipment during underground mine rescue and recovery operations.

§ 11.71 Self-contained breathing apparatus; required components.

(a) Each self-contained breathing apparatus described in § 11.70 shall, where its design requires, contain the following component parts:

(1) Facepiece or mouthpiece, and noseclip;

(2) Respirable breathing gas container;

(3) Supply of respirable breathing gas;

(4) Gas pressure or liquid level gages;

(5) Timer;

(6) Remaining service life indicator or warning device;

(7) Hand-operated valves;

(8) Breathing bag;

(9) Safety relief valve or safety relief system; and

(10) Harness.

(b) The components of each self-contained breathing apparatus shall meet the minimum construction requirements set forth in Subpart G of this part.

§ 11.72 Breathing tubes; minimum requirements.

(a) Flexible breathing tubes used in conjunction with breathing apparatus shall be designed and constructed to prevent:

(1) Restriction of free head movement;

(2) Disturbance of the fit of facepieces and mouthpieces;

(3) Interference with the wearer's activities; and,

(4) Shutoff of airflow due to kinking, or from chin or arm pressure.

§ 11.73 Harnesses; installation and construction; minimum requirements.

(a) Each apparatus shall, where necessary, be equipped with a suitable harness designed and constructed to hold the components of the apparatus in position against the wearer's body.

(b) Harnesses shall be designed and constructed to permit easy removal and replacement of apparatus parts, and, where applicable, provide for holding a full facepiece in the ready position when not in use.

§ 11.74 Apparatus containers; minimum requirements.

(a) Apparatus may be equipped with a substantial, durable container bearing markings which show the applicant's name, the type and commercial designation of the respirator it contains, and all appropriate approval labels.

(b) Containers supplied by the applicant for carrying or storing self-contained breathing apparatus will be inspected, examined, and tested as components of the respirator for which approval is sought.

(c) Containers for self-contained breathing apparatus shall be designed and constructed to permit easy removal of the apparatus.

§ 11.75 Half-mask facepieces, full facepieces, mouthpieces; fit; minimum requirements.

(a) Half-mask facepieces and full facepieces shall be designed and constructed to fit persons with various facial shapes and sizes, either (1) by providing more than one facepiece size, or (2) by providing one facepiece size which will fit varying facial shapes and sizes.

(b) Full facepieces shall provide for the optional use of corrective spectacles or lenses which shall not reduce the respiratory protective qualities of the apparatus.

(c) Apparatus with mouthpieces shall be equipped with noseclips which are securely attached to the mouthpiece or apparatus and provide an airtight seal.

(d) Facepieces shall be designed to prevent eyepiece, spectacle, and lens fogging.

§ 11.76 Facepieces; eyepieces; minimum requirements.

(a) Facepieces shall be designed and constructed to provide adequate vision which is not distorted by the eyepiece.

(b) All eyepieces shall be designed and constructed to meet the impact and penetration requirements specified in Federal Specification, Mask, Air Line, and Respirator, Air Filtering, Industrial, GGG-M-125d, October 11, 1965. This Federal Specification is available from the Government Printing Office or the General Services Administration.

§ 11.77 Inhalation and exhalation valves; minimum requirements.

(a) Inhalation and exhalation valves shall be provided where necessary and protected against damage and distortion.

(b) Exhalation valves shall be:

(1) Protected against external influence, and

(2) Designed and constructed to prevent inward leakage of contaminated air.

§ 11.78 Head harnesses; minimum requirements.

(a) Facepieces shall be equipped with adjustable and replaceable head harnesses designed and constructed to provide adequate tension during suspension and an even distribution of pressure over the entire area in contact with the face.

(b) Mouthpieces shall be equipped, where applicable, with adjustable and replaceable harnesses designed and constructed to hold the mouthpiece in place.

§ 11.79 Breathing gas; minimum requirements.

(a) Breathing gas used to supply apparatus shall be respirable and contain no less than 19.5 (dry atmosphere) volume percent of oxygen.

(b) Oxygen, including liquid oxygen, shall meet the minimum requirements for medical or breathing oxygen set forth in the U.S. Pharmacopeia.

(c) Compressed, gaseous breathing air shall meet the applicable minimum grade requirements for Type I gaseous air set forth in the Compressed Gas

Association Commodity Specification for Air, G-7.1 (Grade D or higher quality).

(d) Compressed, liquefied breathing air shall meet the applicable minimum grade requirements for Type II liquid air set forth in the Compressed Gas Association Commodity Specification for Air, G-7.1 (Grade B or higher quality).

§ 11.79-1 Interchangeability of oxygen and air prohibited.

Approvals shall not be issued by MSHA and the Institute for any apparatus, combination of respirator assemblies, or any apparatus or respirator component which is designed or constructed to permit the interchangeable use of oxygen and air.

§ 11.80 Compressed breathing gas and liquefied breathing gas containers; minimum requirements.

(a) Compressed breathing gas and liquefied breathing gas containers shall meet the minimum requirements of the Department of Transportation for Interstate shipment of such containers when fully charged.

(b) Such containers shall be permanently and legibly marked to identify their contents, e.g., compressed breathing air, compressed breathing oxygen, liquefied breathing air, or liquefied breathing oxygen.

(c) Containers normally removed from apparatus for refilling shall be equipped with a dial indicating gage which shows the pressure in the container.

(d) Compressed breathing gas contained valves or a separate charging system or adapter provided with each apparatus shall be equipped with outlet threads specified for the service by the American National Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections, B57.1 (1965), obtainable from American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

§ 11.81 Gas pressure gages; minimum requirements.

(a) Gas pressure gages employed on compressed breathing gas containers shall be calibrated in pounds per square inch.

(b) Liquid-level gages shall be calibrated in fractions of total container capacity, or in units of liquid volume.

(c) Gas pressure gages other than those specified in paragraphs (a) and (b) of this section shall be calibrated in:

(1) Pounds per square inch, or

(2) In fractions of total container capacity, or

(3) Both in pounds per square inch and fractions of total container capacity.

(d) (1) Dial-indicating gages shall be reliable to within ±5 percent of full scale when tested both up and down the scale at each of 5 equal intervals.

(2) The full scale graduation of dial-indicating gages shall not exceed 150 percent of the maximum rated cylinder pressures specified for the container in applicable Department of Transportation specifications or permits.

(e) (1) Stem-type gages shall be readable by sight and by touch and shall have a stem travel distance of not less than one-fourth inch between each graduation.

(2) A minimum of five graduations shall be engraved on the stem of each gage and these graduations shall include readings for empty, one-quarter, one-half, three-quarters, and full.

(3) Stem gage readings shall not vary from true readings by more than one-sixteenth inch per inch of stem travel.

(f) The loss of gas through a broken gage or severed gage connection shall not exceed 70 liters per minute when the cylinder pressure is 6,900 kN/m.^{2} (1,000 pounds per square inch gage) or when the liquid level is at one-half.

(g) Where gages are connected to the apparatus through a gage line, the gage and line shall be capable of being isolated from the apparatus except where the failure of the gage or line would not impair the performance or service life of the apparatus.

(h) Oxygen pressure gages shall have the words, "Oxygen" and "Use No Oil," marked prominently on the gage.

(i) (1) Apparatus using compressed breathing gas, except apparatus classified for escape only, shall be equipped with gages visible to the wearer which indicate the remaining gas content in the container.

(2) Apparatus using liquefied breathing gas, except apparatus classified for escape only, shall be equipped with gages visible to the wearer which indicate the remaining liquid content in the container; however, where the liquid content cannot be rapidly vented, and the service time of the device begins immediately after filling, a timer shall be provided in place of a visible gage.

§ 11.82 Timers; elapsed time indicators; remaining service life indicators; minimum requirements.

(a) Elapsed time indicators shall be provided for apparatus with a chemical oxygen source, except:

(1) Apparatus used for escape only; or,

(2) Liquefied breathing gas apparatus equipped with gages visible to the wearer which indicate the remaining liquid content in the container.

(b) The timer or other indicator shall be accurately calibrated in minutes of remaining service life.

(c) Timers shall be readable by sight and by touch during use by the wearer.

(d) Timers shall be equipped with automatically preset alarms which will warn the wearer for a period of 7 seconds or more after the preset time has elapsed.

(e) Remaining service-life indicators or warning devices shall be provided in addition to a pressure gage on compressed gas self-contained breathing apparatus, except apparatus used for escape only, and shall operate automatically without preadjustment by the wearer.

(f) Each remaining service-life indicator or warning device shall give an alarm when the remaining service life of the apparatus is reduced within a range of 20 to 25 percent of its rated service time.

§ 11.83 Hand-operated valves; minimum requirements.

(a) Hand-operated valves shall be designed and constructed to prevent removal of the stem from the valve body during normal usage to insure against a sudden release of the full pressure of the container when the valve is opened.

(b) Valves shall be designed or positioned to prevent accidental opening and closing, and damage from external forces.

(c) Valves operated during use of the apparatus shall be installed in locations where they can be readily adjusted by the wearer.

(d) Main-line valves, designed and constructed to conserve gas in the event of a regulator or demand valve failure, shall be provided in addition to gas container valves, except when such failure will not affect performance.

(e) Hand-operated bypass systems designed and constructed to permit the wearer to breathe and to conserve his gas supply in the event of a regulator or demand valve failure, shall be provided where necessary.

(f) Valves installed on apparatus shall be clearly distinguishable from one another by sight and touch.

(g) The bypass system valve control shall be colored red.

(h) A main-line or bypass valve or system will not be required on apparatus for escape only.

(i) Safety relief valves or systems, designed and constructed to release excess pressure in the breathing circuit, shall be provided on closed-circuit apparatus, and shall meet the following requirements:

(1) The relief valve or system shall operate automatically when the pressure in the breathing circuit on the inhalation side of the breathing bag reaches 13 mm. (one-half inch) water-column height of pressure above the minimum pressure required to fill the breathing bag, within the breathing resistance requirements for the apparatus.

(2) The relief valve or system shall be designed to prevent external atmospheres from entering the breathing circuit.

(3) The relief valve or system shall be designed to permit manual overriding for test purposes and in the event of a failure in the valve or system.

§ 11.84 Breathing bags; minimum requirements.

(a) Breathing bags shall have sufficient volume to prevent gas waste during exhalation and to provide an adequate reserve for inhalation.

(b) Breathing bags shall be constructed of materials which are flexible and resistant to gasoline vapors.

(c) Breathing bags shall be installed in a location which will protect them from damage or collapse by external forces, except on apparatus classified for escape only.

§ 11.85 Self-contained breathing apparatus; performance requirements; general.

Self-contained breathing apparatus and the individual components of each such device shall as applicable meet the requirements specified in §§ 11.85-1 through 11.85-19.

§ 11.85-1 Component parts exposed to oxygen pressures; minimum requirements.

Each applicant shall certify that the materials employed in the construction of component parts exposed to oxygen pressures above atmospheric pressure are safe and compatible for their intended use.

§ 11.85-2 Compressed gas filters; minimum requirements.

All self-contained breathing apparatus using compressed gas shall have a filter downstream of the gas source to effectively remove particles from the gas stream.

§ 11.85-3 Breathing bag test.

(a) Breathing bags will be tested in an air atmosphere saturated with gasoline vapor at room temperature (24-30° C./75-85° F.) for a continuous period of twice the rated time of the apparatus (except for apparatus for escape only where the test period shall be the rated time of the apparatus).

(b) The bag will be operated during this test by a breathing machine with 24 respirations per minute and a minute-volume of 40 liters.

(c) A breathing machine cam with a work rate of 622 kg.-m./min. will be used.[1]

(d) The air within the bag(s) shall not contain more than 100 parts per million of gasoline vapor at the end of the test.

§ 11.85-4 Weight requirement.

(a) The completely assembled and fully charged apparatus shall not weigh more than 16 kg. (35 pounds); however, where the weight decreases by more than 25 percent of its initial charge weight during its rated service life, the maximum allowable weight of a completely assembled and fully charged apparatus shall be 18 kg. (40 pounds).

(b) Where an apparatus employs equipment which contributes materially to the wearer's comfort, e.g., a cooling system, the completely assembled and fully charged apparatus shall not weigh more than 18 kg. (40 pounds) regardless of the decrease in weight during use.

§ 11.85-5 Breathing resistance test; inhalation.

(a) Resistance to inhalation airflow will be measured in the facepiece or mouthpiece while the apparatus is operated by a breathing machine as described in § 11.85-3.

(b) The inhalation resistance of open-circuit apparatus shall not exceed 32 mm. (1.25 inch) water-column height (at a flow rate of 120 liters per minute).

(c) The inhalation resistance of closed-circuit apparatus shall not exceed the difference between exhalation resistance (§ 11.85-6(e)) and 10 cm. (4 inches) water-column height.

§ 11.85-6 Breathing resistance test; exhalation.

(a) Resistance to exhalation airflow will be measured in the facepiece or mouthpiece of open-circuit apparatus with air flowing at a continuous rate of 85 liters per minute.

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[1] Silverman, L., G. Lee, T. Plotkin, L. Amory, and A. R. Yancey, Fundamental Factors in Design of Protective Equipment, O.S.R.D. Report No. 5732, issued Apr. 1, 1945. The dimensions of the breathing machine cam are available from MSHA upon request.

(b) The exhalation resistance of demand apparatus shall not exceed 25 mm. (1 inch) water-column height.

(c) The exhalation resistance of pressure-demand apparatus shall not exceed the static pressure in the facepiece by more than 51 mm. (2 inches) water-column height.

(d) The static pressure (at zero flow) in the facepiece shall not exceed 38 mm. (1.5 inches) water-column height.

(e) Resistance to exhalation airflow will be measured in the facepiece or mouthpiece of closed-circuit apparatus with a breathing machine as described in § 11.85-3, and the exhalation resistance shall not exceed 51 mm. (2 inches) water-column height.

§ 11.85-7 Exhalation valve leakage test.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm. (1 inch) water-column height while in a normal operating position.

(b) Leakage between the valve and the valve seat shall not exceed 30 milliliters per minute.

§ 11.85-8 Gas flow test; open-circuit apparatus.

(a) A static-flow test will be performed on all open-circuit apparatus.

(b) The flow from the apparatus shall be greater than 200 liters per minute when the pressure in the facepiece of demand-apparatus is lowered by 51 mm. (2 inches) water-column height when full container pressure is applied.

(c) Where pressure demand apparatus are tested, the flow will be measured at zero gage pressure in the facepiece.

(d) Where apparatus with compressed-breathing-gas containers are tested, the flow test shall also be made with 3,450 kN/m.^{2} (500 p.s.i.g.) container pressure applied.

§ 11.85-9 Gas flow test; closed-circuit apparatus.

(a) Where oxygen is supplied by a constant-flow device only, the rate of flow shall be at least 3 liters per minute for the entire rated service time of the apparatus.

(b) Where constant flow is used in conjunction with demand flow, the constant flow shall be greater than 1.5 liters per minute for the entire rated service time.

(c) All demand-flow devices shall provide at least 30 liters of oxygen per minute when in the fully open position.

§ 11.85-10 Service time test; open-circuit apparatus.

(a) Service time will be measured with a breathing machine as described in § 11.85-3.

(b) The open-circuit apparatus will be classified according to the length of time it supplies air or oxygen to the breathing machine.

(c) The service time obtained on this test will be used to classify the open-circuit apparatus in accordance with § 11.53.

§ 11.85-11 Service time test; closed-circuit apparatus.

(a) The closed-circuit apparatus will be classified according to the length of time it supplies adequate breathing gas to the wearer during man test No. 4 described in Table 4.

(b) The service time obtained on man test No. 4 will be used to classify the closed-circuit apparatus in accordance with § 11.53.

§ 11.85-12 Test for carbon dioxide in inspired gas; open- and closed-circuit apparatus; maximum allowable limits.

(a) Open-circuit apparatus:

(1) The concentration of carbon dioxide in inspired gas in open-circuit apparatus will be measured at the mouth while the apparatus mounted on a dummy head is operated by a breathing machine.[2]

(2) The breathing rate will be 14.5 respirations per minute with a minute-volume of 10.5 liters.

(3) A sedentary breathing machine cam will be used.

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[2] Kloos, E. J., and J. Lamonica, A Machine-Test Method for Measuring Carbon Dioxide in the Inspired Air of Self-Contained Breathing Apparatus. Bureau of Mines Report of Investigations 6865, 1966, 11 pp.

(4) The apparatus will be tested at a temperature of 27° ± 2° C. (80° ± 5° F.).

(5) A concentration of 5 percent carbon dioxide in air will be exhaled into the facepiece.

(b) Closed-circuit apparatus: (1) The concentration of carbon dioxide in inspired gas in closed-circuit apparatus will be measured at the mouth while the parts of the apparatus contributing to dead-air space are mounted on a dummy head and operated by the breathing machine as in paragraphs (a)(1) through (5) of this section.

(c) During the testing required by paragraphs (a) and (b) of this section, the concentration of carbon dioxide in inspired gas at the mouth will be continuously recorded, and the maximum average concentration during the inhalation portion of the breathing cycle shall not exceed the following limits:

Where the service time is	Maximum allowable average concentration of carbon dioxide in inspired air percent by volume
Not more than 30 minutes	2.5
1 hour	2.0
2 hours	1.5
3 hours	1.0
4 hours	1.0

(d) In addition to the test requirements for closed-circuit apparatus set forth in paragraph (b) of this section, gas samples will be taken during the course of the man tests described in Tables 1, 2, 3, and 4. These gas samples will be taken from the closed-circuit apparatus at a point downstream of the carbon dioxide sorbent, and they shall not contain more than 0.5 percent carbon dioxide at any time, except on apparatus for escape only, using a mouthpiece only, the sample shall not contain more than 1.5 percent carbon dioxide at any time.

[37 FR 6244, Mar. 25, 1972, as amended at 41 FR 10892, Mar. 15, 1976]

§ 11.85-13 Tests during low temperature operation.

(a) The applicant shall specify the minimum temperature for safe operation and two persons will perform the tests described in paragraphs (c) and (d) of this section, wearing the apparatus according to applicant's directions. At the specified temperature, the apparatus shall meet all the requirements described in paragraph (e) of this section.

(b) The apparatus will be precooled at the specified minimum temperature for 4 hours.

(c) The apparatus will be worn in the low temperature chamber for 30 minutes, or for the service time of the apparatus, whichever is less.

(d) During the test period, alternate 1-minute periods of exercise and rest will be required with the exercise periods consisting of stepping onto and off a box 21.5 cm. (8-½ inches) high at a rate of 30 cycles per minute.

(e) (1) The apparatus shall function satisfactorily at the specified minimum temperature on duplicate tests.

(2) The wearer shall have sufficient unobscured vision to perform the work.

(3) The wearer shall not experience undue discomfort because of airflow restriction or other physical or chemical changes in the operation of the apparatus.

(f) Auxiliary low-temperature parts which are commercially available to the user may be used on the apparatus to meet the requirements described in paragraph (e) of this section.

§ 11.85-14 Man tests; testing conditions; general requirements.

(a) The man tests described in Tables 1, 2, 3, and 4 represent the workload performed in the mining, mineral, or allied industries by a person wearing the apparatus tested.

(b) The apparatus tested will be worn by Institute personnel trained in the use of self-contained breathing apparatus, and the wearer will, before participating in these tests, pass a physical examination conducted by a qualified physician.

(c) All man tests will be conducted by the Institute.

(d) The apparatus will be examined before each man test to ensure that it is in proper working order.

(e) Breathing resistance will be measured within the facepiece or mouthpiece and the wearer's pulse and respiration rate will be recorded during each 2 minute sample period prescribed in tests 1, 2, 3, and 4.

(f) Man tests 1, 2, 3, 4, 5, and 6 will be conducted in duplicate.

(g) If man tests are not completed through no fault of the apparatus, the test will be repeated.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.85-15 Man tests 1, 2, 3, and 4; requirements.

(a) Man tests 1, 2, 3, and 4, set forth in Tables 1, 2, 3, and 4 respectively, prescribe the duration and sequence of specific activities. These tests will be conducted to:

(1) Familiarize the wearer with the apparatus during use;

(2) Provide for a gradual increase in activity;

(3) Evaluate the apparatus under different types of work and physical orientation; and

(4) Provide information on the operating and breathing characteristics of the apparatus during actual use.

§ 11.85-16 Man test 5; requirements.

(a) Test 5 will be conducted to determine the maximum length of time the apparatus will supply the respiratory needs of the wearer while he is sitting at rest.

(b) The wearer will manipulate the devices controlling the supply of breathing gas to the advantage of the apparatus.

(c) Samples of inspiration from within the apparatus facepiece or mouthpiece shall be taken once every 15 minutes, and shall meet the minimum requirement for oxygen specified in § 11.79(a), and the maximum allowable average concentration of carbon dioxide specified in § 11.85-12(c).

(d) One sample of inspiration will be taken in the case of 3-, 5-, and 10-minute apparatus.

§ 11.85-17 Man test 6; requirements.

(a) Man test 6 will be conducted with respect to liquefied breathing gas apparatus only.

(b) This test will be conducted to evaluate operation of the apparatus in other than vertical positions.

(c) The wearer will lie face downward for one-fourth the service life of the apparatus with a full charge of liquefied breathing gas, and then a one-quarter full charge of liquefied breathing gas.

(d) The test will be repeated with the wearer lying on each side and on his back.

(e) The oxygen content of the gas supplied to the wearer by the apparatus will be continuously measured.

§ 11.85-18 Man tests; performance requirements.

(a) The apparatus shall satisfy the respiratory requirements of the wearer for the classified service time.

(b) Fogging of the eyepiece shall not obscure the wearer's vision, and the wearer shall not experience undue discomfort because of fit or other characteristics of the apparatus.

(c) When the ambient temperature during testing is 24°±6° C. (75°±10° F.), the maximum temperature of inspired air recorded during man tests shall not exceed the following, after correction for deviation from 24° C. (75° F.):

Where service life of apparatus is—	Where percent relative humidity of inspired air is—	Maximum permissible temperature of inspired air shall not exceed—	
		° F.	° C.
¼ hour or less	0-100	135	57
½ hour to ¾ hour	0-50	125	52
	50-100	[1]110	[1]43
1 to 2 hours	0-50	115	46
	50-100	[1]105	[1]41
3 hours	0-50	110	43
	50-100	[1]100	[1]38
4 hours	0-50	105	41
	50-100	[1]95	[1]35

[1] Where percent relative humidity is 50-100 and apparatus is designed for escape only, these maximum permissible temperatures will be increased by 5° C. (10° F.).

§ 11.85-19 Gas tightness test; minimum requirements.

(a) Each apparatus will be tested for tightness by persons wearing it in an atmosphere of 1,000 p.p.m. isoamyl acetate.

(b) Six persons will each wear the apparatus in the test concentrations specified in paragraph (a) of this section for 2 minutes and none shall detect the odor or taste of the test vapor.

TABLE 1—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 1, IN MINUTES

[30 CFR Part 11, Subpart H, § 11.85, et seq.]

Activity	Service time—							
	3 minutes	5 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2, 3, and 4 hours
Sampling and readings				2	2	2	2	Perform 1 hour test 2, 3, or 4 times respectively.
Walks at 4.8 km. (3 miles) per hour	3	5	3	4	8	12	18	
Sampling and readings			2	2	2	2	2	
Walks at 4.8 km. (3 miles) per hour			3	5	8	12	18	
Sampling and readings			2	2	2	2	2	
Walks at 4.8 km. (3 miles) per hour					6	13	16	
Sampling and readings					2	2	2	

TABLE 2—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 2, IN MINUTES

[30 CFR Part 11, Subpart H, § 11.85, et seq]

Activity	Service time—							
	3 minutes	75 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2, 3 and 4 hours [1]
Sampling and readings				2	2	2	2	2.
Walks at 4.8 km. (3 miles) per hour			1	1	3	4	6	10.
Carries 23 kg. (50 pound) weight over overcast.			1 time in 2 minutes.	1 time in 2 minutes.	2 times in 4 minutes.	3 times in 6 minutes.	4 times in 8 minutes.	5 times in 10 minutes.
Walks at 4.8 km. (3 miles) per hour				1	3	3	3	5.
Climbs vertical treadmill [2] (or equivalent)	1	1	1	1	1	1	1	1.
Walks at 4.8 km. (3 miles) per hour		1	1			2	3	5.
Climbs vertical treadmill (or equivalent)		1				1	1	1.
Sampling and readings					2	2	2	2.
Walks at 4.8 km. (3 miles) per hour				2	2	3	5	11.
Climbs vertical treadmill (or equivalent)				1	1	1	1	1.
Carries 23 kg. (50 pound) weight over overcast.				1 time in 2 minutes.	3 times in 6 minutes.	4 times in 8 minutes.	5 times in 10 minutes	5 times in 10 minutes.
Sampling and readings			2			2	2	2.
Walks at 4.8 km. (3 miles) per hour				1	3	3	3	
Climbs vertical treadmill (or equivalent)			1		1	1	1	Then repeat above activities once.
Walks at 4.8 km. (3 miles) per hour			2			2	3	
Climbs vertical treadmill (or equivalent)						1	1	
Carries 20 kg. (45 pound) weight and walks at 4.8 km. (3 miles) per hour.	1						2	

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TABLE 2—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 2, IN MINUTES—Continued

[30 CFR Part 11, Subpart H, § 11.85, et seq]

Activity	Service time—							
	3 minutes	75 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2, 3 and 4 hours [1]
Walks at 4.8 km. (3 miles) per hour	1	2				1	4	
Sampling and readings				2	2	2	2	

[1] Total test time for Test 2 for 2-hour, 3-hour, and 4-hour apparatus is 2 hours.

[2] Treadmill shall be inclined 15° from vertical and operated at a speed of 1 foot per second.

TABLE 3—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 3, IN MINUTES

[30 CFR Part 11, Subpart H, § 11.85, et seq]

Activity	Service time—							
	3 minutes	75 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2, 3 and 4 hours [1]
Sampling and readings				2	2	2	2	(2)
Walks at 4.8 km. (3 miles) per hour			1	1	2	2	3	
Runs at 9.7 km. (6 miles) per hour	1	1	1	1	1	1	1	
Pulls 20 kg. (45 pound) weight to 5 feet		15 times in 1 minute.		30 times in 2 minutes.	30 times in 2 minutes.	30 times in 2 minutes.	60 times in 6 minutes.	
Lies on side	½	1	1	2	3	4	5	
Lies on back	½	1	1	2	2	3	3	
Crawls on hands and knees	1	1	1	2	2	2	2	
Sampling and readings			2		2	2	2	
Runs at 9.7 km. (6 miles) per hour				1	1	1	1	
Walks at 4.8 km. (3 miles) per hour					2	8	10	
Pulls 20 kg. (45 pound) weight to 5 feet			30 times in 2 minutes.	60 times in 6 minutes.		60 times in 6 minutes.	60 times in 6 minutes.	
Sampling and readings				2		2	2	
Walks at 4.8 km. (3 miles) per hour			1		3	4	10	
Lies on side						2	4	
Lies on back						2	1	
Sampling and readings					2	2	2	

[1] Total test time for Test 3 for 2-hour, 3-hour, and 4-hour apparatus is 2 hours.

[2] Perform test No. 3 for 1 hr. apparatus; then perform test No. 1 for 1 hour apparatus.

TABLE 4—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 4, IN MINUTES

[30 CFR Part 11, Subpart H, § 11.85, et seq.]

Activity	Service time—									
	3 minutes	5 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2 hours	3 hours	4 hours
Sampling and readings.				2	2	2	2	(2)	(2)	(2)
Walks at 4.8 km. (3 miles) per hour.				1	2	2	2			
Climbs vertical treadmill [1] (or equivalent).	1	1	1	1	1	1	1			
Walks at 4.8 km. (3 miles) per hour.		1	1	1	2	2	2			
Pulls 20 kg. (45 pound) weight to 5 feet.		30 times in 2 minutes.	30 times in 2 minutes.	30 times in 2 minutes.	60 times in 5 minutes.	60 times in 5 minutes.	60 times in 5 minutes.			
Walks at 4.8 km. (3 miles) per hour.			1	1	1	2	3			
Carries 23 kg. (50 pound) weight over overcast.				1 time in 1 minute.	1 time in 1 minute.	2 times in 3 minutes.	4 times in 8 minutes.			
Sampling and readings.			2		2	2	2			
Walks at 4.8 km. (3 miles) per hour.				1	3	3	4			
Runs at 9.7 km. (6 miles) per hour.		1	1	1	1	1	1			
Carries 23 kg. (50 pound) weight over overcast.			1 time in 1 minute.	1 time in 1 minute.	2 times in 3 minutes.	4 times in 6 minutes.	6 times in 9 minutes.			
Pulls 20 kg (45 pound) weight to 5 feet.	15 times in 1 minute.			15 times in 1 minute.	60 times in 5 minutes.	30 times in 2 minutes.	36 times in 3 minutes.			
Sampling and readings.				2	2	2	2			
Walks at 4.8 km. (3 miles) per hour.	1		1			2	6			
Pulls 20 kg. (45 pound) weight to 5 feet.						60 times in 5 minutes.	60 times in 5 minutes.			
Carries 20 kg. (45 pound) weight and walks at 4.8 km. (3 miles) per hour.						3	3			

TABLE 4—DURATION AND SEQUENCE OF SPECIFIC ACTIVITIES FOR TEST 4, IN MINUTES—Continued

[30 CFR Part 11, Subpart H, § 11.85, et seq.]

Activity	Service time—									
	3 minutes	5 minutes	10 minutes	15 minutes	30 minutes	45 minutes	1 hour	2 hours	3 hours	4 hours
Sampling and readings						2	2			

[1] Treadmill shall be inclined 15° from vertical and operated at a speed of 30 cm. (1 foot) per second.

[2] Perform test No. 1 for 30-minute apparatus; then perform test No. 1 for 1-hour apparatus; then perform test No. 1 for 30-minute apparatus.

[3] Perform test No. 1 for 1-hour apparatus; then perform test No. 4 for 1-hour apparatus; then perform test No. 1 for 1-hour apparatus.

[4] Perform test No. 1 for 1-hour apparatus; then perform test No. 4 for 1-hour apparatus; then perform test No. 1 for 1-hour apparatus twice (i.e., two one-hour tests).

Subpart I—Gas Masks

§ 11.90 Gas masks; description.

(a) Gas masks including all completely assembled air purifying masks designed for use as respiratory protection during entry into atmospheres not immediately dangerous to life or health or escape only from hazardous atmospheres containing adequate oxygen to support life are described as follows:

(1) *Front-mounted or back-mounted gas mask.* A gas mask which consists of a full facepiece, a breathing tube, a canister at the front or back, a canister harness, and associated connections.

(2) *Chin-style gas mask.* A gas mask which consists of a full facepiece, a canister which is usually attached to the facepiece, and associated connections.

(3) *Escape gas mask.* A gas mask designed for use during escape only from hazardous atmospheres which consists of a facepiece or mouthpiece, a canister, and associated connections.

(b) Gas masks shall be further described according to the types of gases or vapors against which they are designed to provide respiratory protection, as follows:

Type of front-mounted or back-mounted gas mask

Acid gas [3] [4] [5]
Ammonia
Carbon monoxide
Organic Vapor [3] [4] [5]
Other gas(es) and vapor(s) [3] [4] [5]
Combination of two or more of the above gases and vapors. [3] [4] [5]
Combination of acid gas, ammonia, carbon monoxide, and organic vapors. [3] [4] [5]

Type of chin-style gas mask

Acid gas [3] [4] [5]
Ammonia
Carbon monoxide
Organic vapor [3] [4] [5]
Other gas(es) and vapor(s) [3] [4] [5]
Combination of two or more of the above gases and vapors. [3] [4] [5]

Type of escape gas mask

Acid gas [3] [4] [5] [6]
Ammonia [6]
Carbon monoxide
Organic vapor [3] [4] [5] [6]
Other gas(s) and vapor(s) [3] [4] [5] [6]
Combination of two or more of the above gases and vapors. [3] [4] [5] [6]

(c) Gas masks for respiratory protection against gases and vapors other than those specified in paragraph (b) of this section, may be approved upon submittal of an application in writing for approval to the Testing and Certification Laboratory listing the gas or vapor and suggested maximum use concentration for the specific type of gas mask. The Institute and MSHA will consider the application and accept or reject it on the basis of effect on the wearer's health and safety and any field experience in use of gas masks for such exposures. If the application is accepted, the Institute will test such masks in accordance with the requirements of this subpart.

NOTE: For information on safe use concentrations and for information governing the selection, use, and maintenance of gas masks, the gas mask user should refer to regulations issued by the Mine Safety and Health Administration or by the Occupational Safety and Health Administration, and to other applicable regulations concerning gas masks. Recommendations based on such regulations may also be obtained from the National Institute for Occupational Safety and Health, 944 Chestnut Ridge Road, Morgantown, W. Va. 26505, Attention: Director, TCL; or from the NIOSH Regional Consultants for Occupational Safety and Health in the DHHS Regional Offices throughout the country.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6994, Mar. 15, 1973; 41 FR 10893, Mar. 15, 1976; 42 FR 65167, Dec. 30, 1977; 47 FR 28095, June 29, 1982]

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[3] Approval may be for acid gases or organic vapors as a class or for specific acid gases or organic vapors.

[4] Not for use against gases or vapors with poor warning properties (except where MSHA or Occupational Safety and Health Administration standards permit such use for a specific gas or vapor) or those which generate high heats of reaction with sorbent materials in the canister.

[5] Use of the gas mask may be limited by factors such as lower explosive limit, toxicological effects, and facepiece fit. Limitations on gas mask service life and sorbent capacity limitations, shall be specified by the applicant in instructions for selection, use and maintenance of the gas mask.

[6] Eye protection may be required in certain concentrations of gases and vapors.

§ 11.91 Gas masks; required components.

(a) Each gas mask described in § 11.90 shall, where its design requires, contain the following component parts:

(1) Facepiece or mouthpiece and noseclip;

(2) Canister or cartridge;

(3) Canister harness;

(4) External check valve; and

(5) Breathing tube.

(b) The components of each gas mask shall meet the minimum construction requirements set forth in Subpart G of this part.

§ 11.92 Canisters and cartridges in parallel; resistance requirements.

Where two or more canisters or cartridges are used in parallel, their resistance to airflow shall be essentially equal.

§ 11.93 Canisters and cartridges; color and markings; requirements.

The color and markings of all canisters and cartridges or labels shall conform with the requirements of the American National Standard for Identification of Air Purifying Respirator Canisters and Cartridges, K 13.1-1973, obtainable from the American National Standards Institute, Inc.; 1430 Broadway; New York, N.Y. 10018.

[41 FR 10894, Mar. 15, 1976]

§ 11.94 Filters used with canisters and cartridges; location; replacement.

(a) Particulate matter filters used in conjunction with a canister or cartridge shall be located on the inlet side of the canister or cartridge.

(b) Filters shall be incorporated in or firmly attached to the canister or cartridge and each filter assembly shall, where applicable, be designed to permit its easy removal from and replacement in the canister or cartridge.

§ 11.95 Breathing tubes; minimum requirements.

(a) Flexible breathing tubes used in conjunction with gas masks shall be designed and constructed to prevent:

(1) Restriction of free head movement;

(2) Disturbance of the fit of facepieces or mouthpieces;

(3) Interference with the wearer's activities; and,

(4) Shutoff of airflow due to kinking, or from chin or arm pressure.

§ 11.96 Harnesses; installation and construction; minimum requirements.

(a) Each gas mask shall, where necessary, be equipped with a suitable harness designed and constructed to hold the components of the gas mask in position against the wearer's body.

(b) Harnesses shall be designed and constructed to permit easy removal and replacement of gas mask parts, and where applicable, provide for holding a full facepiece in the ready position when not in use.

§ 11.97 Gas mask containers; minimum requirements.

(a) Gas masks shall be equipped with a substantial, durable container bearing markings which show the applicant's name, the type and commercial designation of mask it contains and all appropriate approval labels.

(b) Containers for gas masks shall be designed and constructed to permit easy removal of the mask.

§ 11.98 Half-mask facepieces, full facepieces and mouthpieces; fit; minimum requirements.

(a) Half-mask facepieces and full facepieces shall be designed and constructed to fit persons with various facial shapes and sizes either: (1) By providing more than one facepiece size, or (2) by providing one facepiece size which will fit varying facial shapes and sizes.

(b) Full facepieces shall provide for optional use of corrective spectacles or lenses, which shall not reduce the respiratory protective qualities of the gas mask.

(c) Half-mask facepieces shall not interfere with the fit of common industrial safety spectacles, as determined by the Institute's facepiece tests in § 11.102-3.

(d) Gas masks with mouthpieces shall be equipped with noseclips which are securely attached to the mouthpiece or gas mask and provide an airtight seal.

(e) Facepieces shall be designed to prevent eyepiece fogging.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.99 Facepieces; eyepieces; minimum requirements.

(a) Full facepieces shall be designed and constructed to provide adequate vision which is not distorted by the eye.

(b) All eyepieces shall be designed and constructed to meet the impact and penetration requirements specified in Federal Specification, Mask, Air Line: and Respirator, Air Filtering, Industrial, GGG-M-125d, October 11, 1965.

§ 11.100 Inhalation and exhalation valves; minimum requirements.

(a) Inhalation and exhalation valves shall be provided where necessary and protected against damage and distortion.

(b) Inhalation valves shall be designed and constructed to prevent excessive exhaled air from adversely affecting cartridges, canisters, and filters.

(c) Exhalation valves shall be protected against external influence, and designed and constructed to prevent inward leakage of contaminated air.

§ 11.101 Head harnesses; minimum requirements.

(a) Facepieces shall be equipped with adjustable and replaceable head harnesses, designed and constructed to provide adequate tension during use and an even distribution of pressure over the entire area in contact with the face.

(b) Mouthpieces shall be equipped, where applicable, with adjustable and replaceable harnesses designed and constructed to hold the mouthpiece in place.

§ 11.102 Gas masks; performance requirements; general.

Gas masks and the individual components of each such device shall, as appropriate, meet the requirements for performance and protection specified in the tests described in §§ 11.102-1 through 11.102-5.

§ 11.102-1 Breathing resistance test; minimum requirements.

(a) Resistance to airflow will be measured in the facepiece or mouthpiece of a gas mask mounted on a breathing machine both before and after each test conducted in accordance with §§ 11.102-3, 11.102-4, and 11.102-5, with air flowing at a continuous rate of 85 liters per minute.

(b) The maximum allowable resistance requirements for gas masks are as follows:

MAXIMUM RESISTANCE

[mm. water-column height]

Type of gas mask	Inhalation		Exhalation
	Initial	Final [1]	
Front-mounted or back-mounted (without particulate filter)	60	75	20
Front-mounted or back-mounted (with approved particulate filter)	70	85	20
Chin-style (without particulate filter)	40	55	20
Chin-style (with approved particulate filter)	65	80	20
Escape (without particulate filter)	60	75	20
Escape (with approved particulate filter)	70	85	20

[1] Measured at end of the service life specified in Tables 5, 6, and 7.

§ 11.102-2 Exhalation valve leakage test.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm. water-column height while in a normal operating position.

(b) Leakage between the valve and valve seat shall not exceed 30 milliliters per minute.

§ 11.102-3 Facepiece tests; minimum requirements.

(a) The complete gas mask will be fitted to the faces of persons having varying facial shapes and sizes.

(b) Where the applicant specifies a facepiece size or sizes for the gas mask, together with the approximate measurements of faces they are designed to fit, the Institute will insure that test subjects suit such facial measurements.

(c) Any gas mask parts which must be removed to perform the facepiece or mouthpiece fit test shall be replaceable without special tools and without disturbing the facepiece or mouthpiece fit.

(d) The facepiece or mouthpiece fit test, using positive or negative pressure recommended by the applicant and described in his instructions will be used before each test specified in paragraph (e) of this section, and in § 11.102-4.

(e) (1) Each wearer will enter a chamber containing 100 p.p.m. isoamyl acetate vapor for a half-mask facepiece and 1,000 p.p.m. isoamyl acetate vapor for a full facepiece or mouthpiece.

(2) The facepiece or mouthpiece may be adjusted, if necessary, in the test chamber before starting the tests.

(3) Each wearer will remain in the chamber for 8 minutes while performing the following activities:

(i) Two minutes, nodding and turning head;

(ii) Two minutes, calisthenic arm movements;

(iii) Two minutes, running in place, and

(iv) Two minutes, pumping with a tire pump into a 28 liter (1 cubic foot) container.

(4) Each wearer shall not detect the odor of isoamyl acetate during the test.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.102-4 Dust, fume, mist, and smoke tests; canisters containing filters; minimum requirements.

(a) Gas mask canisters containing filters for protection against dusts, fumes, mists, and smokes in combination with gases, vapors, or gases and vapors, will be tested as prescribed in § 11.140.

(b) Gas mask canisters designed for protection against smokes will be tested in an atmospheric concentration of 100 micrograms of dioctyl phthalate per liter of air at continuous flow rates of (1) 32 liters per minute, and (2) 85 liters per minute for a period of 5 to 10 seconds, and the DOP leakage through the canister shall not exceed 0.03 percent of the test concentration.

§ 11.102-5 Canister bench tests; minimum requirements.

(a) (1) Bench tests, except for carbon monoxide tests, will be made on an apparatus that allows the test atmosphere at 50±5 percent relative humidity and room temperature (25°±2.5° C.) to enter the canister continuously at concentrations and rates of flow specified in Tables 5, 6, and 7.

(2) Three canisters will be removed from containers and tested as received from the applicant.

(3) Two canisters, other than those described in paragraph (a)(2) of this section, will be equilibrated at room temperature by passing 25 percent relative humidity air through them at 64 liters per minute for 6 hours.

(4) Two canisters, other than those described in paragraphs (a)(2) and (3) of this section, will be equilibrated at room temperature by passing 85 percent relative humidity air through them at 64 liters per minute for 6 hours.

(5) The equilibrated canisters will be resealed, kept in an upright position at room temperature, and tested within 18 hours.

(b) Front-mounted and back-mounted gas mask canisters will be tested and shall meet the minimum requirements set forth in Table 5.

(c) (1) Front-mounted, and back-mounted, and chin-style canisters designated as providing respiratory protection against gases, ammonia, organic vapors, carbon monoxide and particulate contaminants shall have a window or other indicator to warn the gas mask wearer when the canister will no longer satisfactorily remove carbon monoxide from the inhaled air.

(2) Other types of front- and back-mounted canisters may also be equipped with a window or other indicator to warn of imminent leakage of other gases or vapors.

(3) The window indicator canisters will be tested as regular canisters, but shall show a satisfactory indicator change or other warning before the allowable canister penetration has occurred.

(d) Chin-style gas mask canisters shall meet the minimum requirements set forth in Table 6.

(e) Escape gas mask canisters shall meet the minimum requirements set forth in Table 7.

TABLE 5—CANISTER BENCH TESTS AND REQUIREMENTS FOR FRONT-MOUNTED AND BACK-MOUNTED GAS MASK CANISTERS

[30 CFR Part 11, Subpart I, § 11.102-5]

Canister type	Test condition	Test atmosphere			Number of tests	Maximum allowable penetration (parts per million)	Minimum service life (minutes) [1]
		Gas or vapor	Concentration (parts per million)	Flow rate (liters per minute			
Acid gas	As received	SO_2	20,000	64	3	5	12
		Cl_2	20,000	64	3	5	12
	Equilibrated	SO_2	20,000	32	4	5	12
		Cl_2	20,000	32	4	5	12
Organic vapor	As received	CCl_4	20,000	64	3	5	12
	Equilibrated	CCl_4	20,000	32	4	5	12
Ammonia	As received	NH_3	30,000	64	3	50	12
	Equilibrated	NH_3	30,000	32	4	50	12
Carbon monoxide	As received	CO	20,000	[2]64	2	([3])	[4]60
		CO	5,000	[4]32	3	([3])	60
		CO	3,000	[2]32	3	([3])	60
Combination of 2 or 3 of above types [5]							
Combination of all of above types [6]							

[1] Minimum life will be determined at the indicated penetration.

[2] Relative humidity of test atmosphere will be 95±3pct; temperature of test atmosphere will be 25±2.5° C.

[3] Maximum allowable CO penetration will be 385 cm³ during the minimum life. The penetration shall not exceed 500 p/m during this time.

[4] Relative humidity of test atmosphere will be 95±3pct; temperature of test atmosphere entering the test fixture will be 0 + 2.5° C − 0°.

[5] Test conditions and requirements will be applicable as shown above.

[6] Test conditions and requirements will be applicable as shown above, except the minimum service lives for acid as, organic vapor, and ammonia will be 6 min instead of 12 min.

TABLE 6—CANISTER BENCH TESTS AND REQUIREMENTS FOR CHIN-STYLE GAS MASK CANISTERS

[30 CFR Part 11, Subpart I, § 11.102-5]

Canister type	Test condition	Test atmosphere			Number of tests	Maximum allowable penetration (parts per million)	Minimum service life (minutes) [1]
		Gas or vapor	Concentration (parts per million)	Flow rate (liters per minute			
Acid gas	As received	SO_2	5,000	64	3	5	12
		Cl_2	5,000	64	3	5	12
	Equilibrated	SO_2	5,000	32	4	5	12
		Cl_2	5,000	32	4	5	12
Organic vapor	As received	CCl_4	5,000	64	3	5	12
	Equilibrated	CCl_4	5,000	32	4	5	12
Ammonia	As received	NH_3	5,000	64	3	50	12
	Equilibrated	NH_3	5,000	32	4	50	12
Carbon monoxide	As received	CO	20,000	[2]64	2	([3])	60
		CO	5,000	[4]32	3	([3])	60
		CO	3,000	[2]32	3	([3])	60
Combination of 2 or 3 of above types [5]							
Combination of all of above types [6]							

[1] Minimum life will be determined at the indicated penetration.

[2] Relative humidity of test atmosphere will be 95±3pct; temperature of test atmosphere will be 25±2.5° C.

[3] Maximum allowable CO penetration will be 385 cm³ during the minimum life. The penetration shall not exceed 500 p/m during this time.

[4] Relative humidity of test atmosphere will be 95±3pct; temperature of test atmosphere entering the test fixture will be 0 + 2.5° C − 0°.

[5] Test conditions and requirements will be applicable as shown above.

[6] Test conditions and requirements will be applicable as shown above, except the minimum service lives for acid gas, organic vapor, and ammonia will be 6 min instead of 12 min.

TABLE 7—CANISTER BENCH TESTS AND REQUIREMENTS FOR ESCAPE GAS MASK CANISTERS

[30 CFR Part 11, Subpart I, § 11.102-5]

Canister type	Test condition	Test atmosphere			Number of tests	Maximum allowable penetration (parts per million)	Minimum service life (minutes) [1]
		Gas or vapor	Concentration (parts per million)	Flow rate (liters per minute			
Acid gas	As received	SO_2	5,000	64	3	5	12
		Cl_2	5,000	64	3	5	12
	Equilibrated	SO_2	5,000	32	4	5	12
		Cl_2	5,000	32	4	5	12
Organic vapor	As received	CCl_4	5,000	64	3	5	12
	Equilibrated	CCl_4	5,000	32	4	5	12
Ammonia	As received	NH_3	5,000	64	3	50	12
	Equilibrated	NH_3	5,000	32	4	50	12
Carbon monoxide	As received	CO	10,000	[2]32	2	(3)	[4]60
			CO	5,000	[5]32	3	(3)
			CO	3,000	[2]32	3	(3)

[1] Minimum life will be determined at the indicated penetration.

[2] Relative humidity of test atmosphere will be 95±3pct; temperature of test atmosphere will be 25±2.5° C.

[3] Maximum allowable CO penetration will be 385 cm³ during the minimum life. The penetration shall not exceed 500 p/m during this time.

[4] If effluent temperature exceeds 100° C during this test, the escape gas mask shall be equipped with an effective heat exchanger.

[5] Relative humidity of test atmosphere will be 95±3pct; temperature of test atmosphere entering the test fixture will be 0+2.5° C −0° C.

[37 FR 6244, Mar. 25, 1972, as amended at 41 FR 10893, Mar. 15, 1976; 41 FR 12302, Mar. 25, 1976]

Subpart J—Supplied-Air Respirators

§ 11.110 Supplied-air respirators; description.

(a) Supplied-air respirators, including all completely assembled respirators designed for use as respiratory protection during entry into and escape from atmospheres not immediately dangerous to life or health are described as follows:

(1) *Type "A" supplied-air respirators.* A hose mask respirator, for entry into and escape from atmospheres not immediately dangerous to life or health, which consists of a motor-driven or hand-operated blower that permits the free entrance of air when the blower is not operating, a strong large-diameter hose having a low resistance to airflow, a harness to which the hose and the life-line are attached and a tight-fitting facepiece.

(2) *Type "AE" supplied-air respirators.* A Type "A" supplied-air respirator equipped with additional devices designed to protect the wearer's head and neck against impact and abrasion from rebounding abrasive material, and with shielding material such as plastic, glass, woven wire, sheet metal, or other suitable material to protect the window(s) of facepieces, hoods, and helmets which do not unduly interfere with the wearer's vision and permit easy access to the external surface of such window(s) for cleaning.

(3) *Type "B" supplied-air respirators.* A hose mask respirator, for entry into and escape from atmospheres not immediately dangerous to life or health, which consists of a strong large-diameter hose with low resistance to airflow through which the user draws inspired air by means of his lungs alone, a harness to which the hose is attached, and a tight-fitting facepiece.

(4) *Type "BE" supplied-air respirators.* A type "B" supplied-air respirator equipped with additional devices designed to protect the wearer's head and neck against impact and abrasion from rebounding abrasive material, and with shielding material such as plastic, glass, woven wire, sheet metal, or other suitable material to protect the window(s) of facepieces, hoods, and helmets which do not unduly interfere with the wearer's vision and permit easy access to the external surface of such window(s) for cleaning.

(5) *Type "C" supplied-air respirators.* An airline respirator, for entry into and escape from atmospheres not immediately dangerous to life or health, which consists of a source of respirable breathing air, a hose, a detachable coupling, a control valve, orifice, a demand valve or pressure demand valve, an arrangement for attaching the hose to the wearer, and a facepiece, hood, or helmet.

(6) *Type "CE" supplied-air respirators.* A type "C" supplied-air respirator equipped with additional devices designed to protect the wearer's head and neck against impact and abrasion from rebounding abrasive material, and with shielding material such as plastic, glass, woven wire, sheet metal, or other suitable material to protect the window(s) of facepieces, hoods, and helmets which do not unduly interfere with the wearer's vision and permit easy access to the external surface of such window(s) for cleaning.

[37 FR 6244, Mar. 25, 1972, as amended at 42 FR 65167, Dec. 30, 1977]

§ 11.111 Supplied-air respirators; required components.

(a) Each supplied-air respirator described in § 11.110 shall, where its design requires, contain the following component parts:

(1) Facepiece, hood, or helmet;

(2) Air supply valve, orifice, or demand or pressure-demand regulator;

(3) Hand operated or motor driven air blower;

(4) Air supply hose;

(5) Detachable couplings;

(6) Flexible breathing tube; and

(7) Respirator harness.

(b) The component parts of each supplied-air respirator shall meet the minimum construction requirements set forth in Subpart G of this part.

§ 11.112 Breathing tubes; minimum requirements.

(a) Flexible breathing tubes used in conjunction with supplied-air respirators shall be designed and constructed to prevent:

(1) Restriction of free head movement;

(2) Disturbance of the fit of facepieces, mouthpieces, hoods, or helmets;

(3) Interference with the wearer's activities; and

(4) Shutoff of airflow due to kinking, or from chin or arm pressure.

§ 11.113 Harnesses; installation and construction; minimum requirements.

(a) Each supplied-air respirator shall, where necessary, be equipped with a suitable harness designed and constructed to hold the components of the respirator in position against the wearer's body.

(b) Harnesses shall be designed and constructed to permit easy removal and replacement of respirator parts, and where applicable, provide for holding a full facepiece in the ready position when not in use.

§ 11.114 Respirator containers; minimum requirements.

Supplied-air respirators shall be equipped with a substantial, durable container bearing markings which show the applicant's name, the type and commercial designation of the respirator it contains, and all appropriate approval labels.

§ 11.115 Half-mask facepieces, full facepieces, hoods, and helmets; fit; minimum requirements.

(a) Half-mask facepieces and full facepieces shall be designed and constructed to fit persons with various facial shapes and sizes either (1) by providing more than one facepiece size, or (2) by providing one facepiece size which will fit varying facial shapes and sizes.

(b) Full facepieces shall provide for optional use of corrective spectacles or lenses, which shall not reduce the respiratory protective qualities of the respirator.

(c) Hoods and helmets shall be designed and constructed to fit persons with various head sizes, provide for the optional use of corrective spectacles or lenses, and insure against any restriction of movement by the wearer.

(d) Facepieces, hoods, and helmets shall be designed to prevent eyepiece fogging.

§ 11.116 Facepieces, hoods, and helmets; eyepieces; minimum requirements.

(a) Facepieces, hoods, and helmets shall be designed and constructed to provide adequate vision which is not distorted by the eyepiece.

(b) All eyepieces except those on Types B, BE, C, and CE supplied-air respirators shall be designed and constructed to meet the impact and penetration requirements specified in Federal Specification, Mask, Air Line, and Respirator, Air Filtering, Industrial GGG-M-125d, October 11, 1965.

(c) (1) The eyepieces of AE, BE, and CE type supplied-air respirators shall be shielded by plastic, glass, woven wire, sheet metal, or other suitable material which does not interfere with the vision of the wearer.

(2) Shields shall be mounted and attached to the facepiece to provide easy access to the external surface of the eyepiece for cleaning.

§ 11.117 Inhalation and exhalation valves; check valves; minimum requirements.

(a) Inhalation and exhalation valves shall be provided where necessary and protected against distortion.

(b) Exhalation valves shall be:

(1) Protected against damage and external influence; and

(2) Designed and constructed to prevent inward leakage of contaminated air.

(c) Check valves designed and constructed to allow airflow toward the facepiece only shall be provided in the connections to the facepiece or in the hose fitting near the facepiece of all Type A, AE, B, and BE supplied-air respirators.

§ 11.118 Head harnesses; minimum requirements.

Facepieces shall be equipped with adjustable and replaceable head harnesses which are designed and constructed to provide adequate tension during use, and an even distribution of pressure over the entire area in contact with the face.

§ 11.119 Head and neck protection; supplied-air respirators; minimum requirements.

Type AE, BE, and CE supplied-air respirators shall be designed and constructed to provide protection against impact and abrasion from rebounding abrasive materials to the wearer's head and neck.

§ 11.120 Air velocity and noise levels; hoods and helmets; minimum requirements.

Noise levels generated by the respirator will be measured inside the hood or helmet at maximum airflow obtainable within pressure and hose length requirements and shall not exceed 80 dBA.

§ 11.121 Breathing gas; minimum requirements.

(a) Breathing gas used to supply supplied-air respirators shall be respirable breathing air and contain no less than 19.5 volume-percent of oxygen.

(b) Compressed, gaseous breathing air shall meet the applicable minimum grade requirements for Type I gaseous air set forth in the Compressed Gas Association Commodity Specification for Air, G-7.1 (Grade D or higher quality).

(c) Compressed, liquefied breathing air shall meet the applicable minimum grade requirements for Type II liquid air set forth in the Compressed Gas Association Commodity Specification for Air, G-7.1 (Grade B or higher quality).

§ 11.122 Air supply source; hand-operated or motor driven air blowers; Type A supplied-air respirators; minimum requirements.

(a) Blowers shall be designed and constructed to deliver an adequate amount of air to the wearer with either direction of rotation, unless constructed to permit rotation in one direction only, and to permit the free entrance of air to the hose when the blower is not operated.

(b) No multiple systems, whereby more than one user is supplied by one blower, will be approved, unless each hose line is connected directly to a manifold at the blower.

§ 11.123 Terminal fittings or chambers; Type B supplied-air respirators; minimum requirements.

(a) Blowers or connections to air supplies providing positive pressures shall not be approved for use on Type B supplied-air respirators.

(b) Terminal fittings or chambers employed in Type B supplied-air respirators, shall be:

(1) Installed in the inlet of the hose.

(2) Designed and constructed to provide for the drawing of air through corrosion resistant material arranged so as to be capable of removing material larger than 0.149 mm. in diameter (149 micrometers, 100-mesh, U.S. Standard sieve).

(3) Installed to provide a means for fastening or anchoring the fitting or chamber in a fixed position in a zone of respirable air.

§ 11.124 Supplied-air respirators; performance requirements; general.

Supplied-air respirators and the individual components of each such device shall, as appropriate, meet the requirements for performance and protection specified in the tests described in §§ 11.124-1 through 11.124-24.

§ 11.124-1 Hand-operated blower test; minimum requirements.

(a) Hand-operated blowers shall be tested by attaching them to a mechanical drive and operating them 6 to 8 hours daily for a period of 100 hours at a speed necessary to deliver 50 liters of air per minute through each completely assembled respirator. Each respirator shall be equipped with the maximum length of hose with which the device is to be approved and the hose shall be connected to each blower or manifold outlet designed for hose connections.

(b) The crank speed of the hand-operated blower shall not exceed 50 revolutions per minute in order to deliver the required 50 liters of air per minute to each facepiece.

(c) The power required to deliver 50 liters of air per minute to each wearer through the maximum length of hose shall not exceed one-fiftieth horsepower, and the torque shall not exceed a force of 2.3 kg. (5 pounds) on a 20 cm. (8-inch) crank, as defined in § 11.124-3.

(d) The blower shall operate throughout the period without failure or indication of excessive wear of bearings or other working parts.

§ 11.124-2 Motor-operated blower test; minimum requirements.

(a) Motor-operated blowers shall be tested by operating them at their specified running speed 6 to 8 hours daily for a period of 100 hours when assembled with the kind and maximum length of hose for which the device is to be approved and when connected to each blower or manifold outlet designed for hose connections.

(b) The connection between the motor and the blower shall be so constructed that the motor may be disengaged from the blower when the blower is operated by hand.

(c) The blower shall operate throughout the period without failure or indication of excessive wear of bearings or other working parts.

(d) Where a blower, which is ordinarily motor driven, is operated by hand, the power required to deliver 50 liters of air per minute to each wearer through the maximum length of hose shall not exceed one-fiftieth horsepower, and the torque shall not exceed a force of 2.3 kg. (5 pounds) on a 20 cm. (8-inch) crank, as defined in § 11.124-3.

(e) Where the respirator is assembled with the facepiece and 15 m. (50 feet) of the hose for which it is to be approved, and when connected to one outlet with all other outlets closed and operated at a speed not exceeding 50 revolutions of the crank per minute, the amount of air delivered into the respiratory-inlet covering shall not exceed 150 liters per minute.

§ 11.124-3 Method of measuring the power and torque required to operate blowers.

As shown in Figure 1, the blower crank is replaced by a wooden drum, *a* (13 cm. (5 inches) in diameter is convenient). This drum is wound with about 12 m. (40 feet) of No. 2 picture cord, *b*. A weight, *c*, of sufficient mass

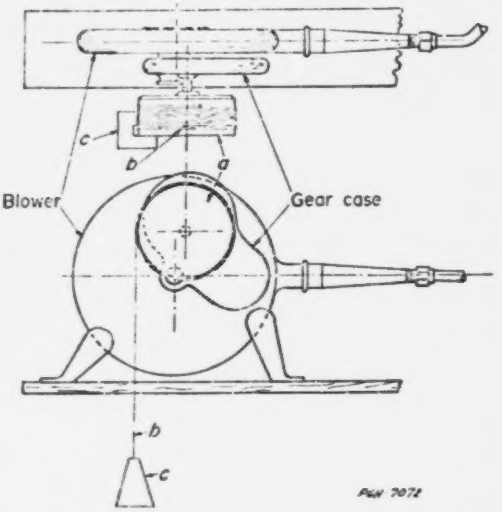

FIGURE 1—Apparatus for measuring power required to operate blower. (30 CFR Part 11, Subpart J, § 11.124-3)

to rotate the blower at the desired speed is suspended from this wire cord. A mark is made on the cord about 3 to 4.5 m. (10 to 15 feet) from the weight, *c*. Another mark is placed at a measured distance (6-9 m./20-30 feet is convenient) from the first. These are used to facilitate timing. To determine the torque or horsepower required to operate the blower, the drum is started in rotation manually at or slightly above the speed at which the power measurement is to be made. The blower is then permitted to assume constant speed, and then as the first mark on the wire leaves the drum, a stopwatch is started. The watch is stopped when the second mark leaves the drum. From these data the foot-pounds per minute and the torque may be calculated.

§ 11.124-4 Type B supplied-air respirator; minimum requirements.

No Type B supplied-air respirator shall be approved for use with a blower or with connection to an air supply device at positive pressures.

§ 11.124-5 Type C supplied-air respirator, continuous flow class; minimum requirements.

(a) Respirators tested under this section shall be approved only when they supply respirable air at the pressures and quantities required.

(b) The pressure at the inlet of the hose connection shall not exceed 863 kN/m². (125 pounds per square inch gage).

(c) Where the pressure at any point in the supply system exceeds 863 kN/m.² (125 pounds per square inch gage), the respirator shall be equipped with a pressure-release mechanism that will prevent the pressure at the hose connection from exceeding 863 kN/m.² (125 pounds per square inch gage) under any conditions.

§ 11.124-6 Type C supplied-air respirator, demand and pressure demand class; minimum requirements.

(a) Respirators tested under this section shall be approved only when used to supply respirable air at the pressures and quantities required.

(b) The manufacturer shall specify the range of air pressure at the point of attachment of the air-supply hose to the air-supply system, and the range of hose length for the respirator. For example, he might specify that the respirator be used with compressed air at pressures ranging from 280-550 kN/m.² (40 to 80 pounds per square inch) with from 6 to 76 m. (15 to 250 feet) of air-supply hose.

(c) The specified air pressure at the point of attachment of the hose to the air-supply system shall not exceed 863 kN/m.² (125 pounds per square inch gage).

(d) (1) Where the pressure in the air-supply system exceeds 863 kN/m.² (125 pounds per square inch gage), the respirator shall be equipped with a pressure-release mechanism that will prevent the pressure at the point of attachment of the hose to the air-supply system from exceeding 863 kN/m.² (125 pounds per square inch gage).

(2) The pressure-release mechanism shall be set to operate at a pressure not more than 20 percent above the manufacturer's highest specified pressure. For example, if the highest specified pressure is 863 kN/m.^{2} (125 pounds per square inch), the pressure-release mechanism would be set to operate at a maximum of 1,035 kN/m.^{2} (150 pounds per square inch).

§ 11.124-7 Air-supply line tests; minimum requirements.

Air supply lines employed on Type A, Type B, and Type C supplied-air respirators shall meet the minimum test requirements set forth in Table 8.

TABLE 8—AIR-SUPPLY-LINE REQUIREMENTS AND TESTS

[30 CFR Part 11, Subpart J, § 11.124-7]

Specific requirements	Requirements for the air-supply lines of the indicated type of supplied-air respirators		
	Type A	Type B	Type C
Length of hose	Maximum of 91 m (300 feet), in multiples of 7.6 m (25 feet).	Maximum of 23 m (75 feet) in multiples of 7.6 m. (25 feet).	Maximum of 91 m. (300 feet) in multiples of 7.6 m. (25 feet). It will be permissible for the applicant to supply hose of the approved type of shorter length than 7.6 m. (25 feet) provided it meets the requirements of the part.
Air flow	None	None	The air-supply hose with air regulating valve or orifice shall permit a flow of not less than 115 liters (4 cubic feet) per minute to tight-fitting and 170 liters (6 cubic feet) per minute to loose-fitting respiratory-inlet coverings through the maximum length of hose for which approval is granted and at the minimum specified air-supply pressure. The maximum flow shall not exceed 425 liters (15 cubic feet) per minute at the maximum specified air-supply pressure with the minimum length of hose for which approval is granted.
Air flow	None	None	The air-supply hose, detachable coupling, and demand valve of the demand class or pressure-demand valve of the pressure-demand class for Type C supplied-air respirators, demand and pressure-demand classes, shall be capable of delivering respirable air at a rate of not less than 115 liters (4 cubic feet) per minite to the respiratory-inlet covering at an inhalation resistance not exceeding 50 millimeters (2 inches) of water-column height measured in the respiratory-inlet covering with any combination of air-supply pressure and length of hose within the applicant's specified range of pressure and hose length. The airflow rate and resistance to inhalation shall be measured while the demand or pressure-demand valve is actuated 20 times per minute by a source of intermittent suction. The maximum rate of flow to the respiratory-inlet covering shall not exceed 425 liters (15 cubic feet) per minute under the specified operating conditions.
Air-regulating valve	None	None	If an air-regulating valve is provided, it shall be so designed that it will remain at a specific adjustment, which will not be affected by the ordinary movement of the wearer.

TABLE 8—AIR-SUPPLY-LINE REQUIREMENTS AND TESTS—Continued

[30 CFR Part 11, Subpart J, § 11.124-7]

Specific requirements	Requirements for the air-supply lines of the indicated type of supplied-air respirators		
	Type A	Type B	Type C
			The valve must be so constructed that the air supply with the maximum length of hose and at the minimum specified air-supply pressure will not be less than 115 liters (4 cubic feet) of air per minute to tight-fitting and 170 liters (6 cubic feet) of air per minute to loose-fitting respiratory inlet coverings for any adjustment of the valve. If a demand or pressure-demand valve replaces the air-regulating valve, it shall be connected to the air-supply at the maximum air pressure for which approval is sought by means of the minimum length of air-supply hose for which approval is sought. The outlet of the demand or pressure-demand valve shall be connected to a source of intermittent suction so that the demand or pressure-demand valve is actuated approximately 20 times per minute for a total of 100,000 inhalations. To expedite this test, the rate of actuation may be increased if mutually agreeable to the applicant and MSHA. During this test the valve shall function without failure and without excessive wear of the moving parts. The demand or pressure-demand valve shall not be damaged in any way when subjected at the outlet to a pressure or suction of 25 cm. (10 inches) of water gage for 2 minutes.
Noncollapsibility	The hose shall not collapse or exhibit permanent deformation when a force of 90 kg. (200 pounds) is applied for 5 minutes between 2 planes 7.6 cm. (3 inches) wide on opposite sides of the hose.	Same as Type A	None.
Nonkinkability	None	None	A 7.6 m. (25 foot) section of the hose will be placed on a horizontal-plane surface and shaped into a one-loop coil with one end of the hose connected to an airflow meter and the other end of the hose supplied with air at the minimum specified supply pressure. The connection shall be in the plane of the loop. The other end of the hose will be pulled tangentially to the loop and in the plane of the loop until the hose straightens. To meet the requirements of this test the loop shall maintain a uniform near-circular shape and ultimately unfold as a spiral, without any localized deformation that decreases the flow of air to less than 90 percent of the flow when the hose is tested while remaining in a straight line.
Strength of hose and couplings	Hose and couplings shall not separate or fail when tested with a pull of 113 kg. (250 pounds) for 5 minutes.	Same as Type A	Hose and couplings shall not exhibit any separation or failure when tested with a pull of 45 kg. (100 pounds) for 5 minutes and when tested by subjecting them to an internal air pressure of 2 times the maximum respirator-supply pressure that is specified by the applicant or at 173 kN/m.^{2} (25 pounds per square inch) gage, whichever is higher.

TABLE 8—AIR-SUPPLY-LINE REQUIREMENTS AND TESTS—Continued

[30 CFR Part 11, Subpart J, § 11.124-7]

Specific requirements	Requirements for the air-supply lines of the indicated type of supplied-air respirators		
	Type A	Type B	Type C
Tightness	No air leakage shall occur when the hose and couplings are joined and the joint(s) are immersed in water and subjected to an internal air pressure of 35 kN/m.^{2} (5 pounds per square inch) gage.	None	Leakage of air exceeding 50 cc. per minute at each coupling shall not be permitted when the hose and couplings are joined and are immersed in water, with air flowing through the respirator under a pressure of 173 kN/m.^{2} (25 pounds per square inch) gage applied to the inlet end of the air-supply hose, or at twice the maximum respirator-supply pressure that is specified by the applicant, whichever is higher.
Permeation of hose by gasoline	The permeation of the hose by gasoline will be tested by immersing 7.6 m. (25 feet) of hose and one coupling in gasoline, with air flowing through the hose at the rate of 8 liters per minute for 6 hours. The air from the hose shall not contain more than 0.01 percent by volume of gasoline vapor at the end of the test.	Same as for Type A	Same as for Type A, except the test period shall be 1 hour.
Detachable coupling	None	None	A hand-operated detachable coupling by which the wearer can readily attach or detach the connecting hose shall be provided at a convenient location. This coupling shall be durable, remain connected under all conditions of normal respirator use, and meet the prescribed tests for strength and tightness of hose and couplings.

§ 11.124-8 Harness test; minimum requirements.

(a) (1) Shoulder straps employed on Type A supplied-air respirators shall be tested for strength of material, joints, and seams and must separately withstand a pull of 113 kg. (250 pounds) for 30 minutes without failure.

(2) Belts, rings, and attachments for life lines must withstand a pull of 136 kg. (300 pounds) for 30 minutes without failure.

(3) The hose shall be firmly attached to the harness so as to withstand a pull of 113 kg. (250 pounds) for 30 minutes without separating, and the hose attachments shall be arranged so that the pull or drag of the hose behind an advancing wearer does not disarrange the harness or exert pull upon the facepiece.

(4) The arrangement and suitability of all harness accessories and fittings will be considered.

(b) (1) The harness employed on Type B supplied-air respirators shall not be uncomfortable, disturbing, or interfere with the movements of the wearer.

(2) The harness shall be easily adjustable to various sizes.

(3) The hose shall be attached to the harness in a manner that will withstand a pull of 45 kg. (100 pounds) for 30 minutes without separating or showing signs of failure.

(4) The design of the harness and attachment of the line shall permit dragging the maximum length of hose considered for approval over a concrete floor without disarranging the harness or exerting a pull on the facepiece.

(5) The arrangement and suitability of all harness accessories and fittings will be considered.

(c) The harness employed on Type C respirators shall be similar to that required on the Type B respirator, or, it may consist of a simple arrangement for attaching the hose to a part of the wearer's clothing in a practical manner that prevents a pull equivalent to dragging the maximum length of the hose over a concrete floor from exerting pull upon the respiratory-inlet covering.

(d) Where supplied-air respirators have a rigid or partly rigid head covering, a suitable harness shall be required to assist in holding this covering in place.

§ 11.124-9 Breathing tube test; minimum requirements.

(a) (1) Type A and Type B supplied-air respirators shall employ one or two flexible breathing tubes of the nonkinking type which extend from the facepiece to a connecting hose coupling attached to the belt or harness.

(2) The breathing tubes employed shall permit free head movement, insure against closing off by kinking or by chin or arm pressure, and they shall not create a pull that will loosen the facepiece or disturb the wearer.

(b) Breathing tubes employed on Type C supplied-air respirators of the continuous flow class shall meet the minimum requirements set forth in paragraph (a) of this section, however, an extension of the connecting hose may be employed in lieu of the breathing tubes required.

(c) (1) A flexible, nonkinking type breathing tube shall: (i) Be employed on Type C supplied-air respirators of the demand and pressure-demand class; and (ii) extend from the facepiece to the demand or pressure-demand valve, except where the valve is attached directly to the facepiece.

(2) The breathing tube shall permit free head movement, insure against closing off by kinking or by chin or arm pressure, and shall not create a pull that will loosen the facepiece or disturb the wearer.

§ 11.124-10 Airflow resistance test, Type A and Type AE supplied-air respirators; minimum requirements.

(a) Airflow resistance will be determined when the respirator is completely assembled with the respiratory-inlet covering, the air-supply device, and the maximum length of air-supply hose coiled for one-half its length in loops 1.5 to 2.1 m. (5 to 7 feet) in diameter.

(b) The inhalation resistance, drawn at the rate of 85 liters (3 cubic feet) per minute when the blower is not operating or under any practical condition of blower operation shall not exceed the following amounts:

Maximum length of hose for which respirator is approved		Maximum resistance, water column height	
Feet	Meters	Inches	Millimeters
75	23	1.5	38
150	46	2.5	64
250	76	3.5	89
300	91	4.0	102

(c) The exhalation resistance shall not exceed 25 mm. (1 inch) of water-column height at a flow rate of 85 liters (3 cubic feet) per minute when the blower is not operating or under any practical condition of blower operation.

§ 11.124-11 Airflow resistance test; Type B and Type BE supplied-air respirators; minimum requirements.

(a) Airflow resistance shall be determined when the respirator is completely assembled with the respiratory-inlet covering and the hose in the maximum length to be considered for approval, coiled in loops 1.5 to 2.1 m. (5 to 7 feet) in diameter.

(b) Airflow resistance shall not exceed 38 mm. (1.5 inches) of water-column height to air drawn at the flow rate of 85 liters (3 cubic feet) per minute.

(c) The exhalation resistance shall not exceed 25 mm. (1 inch) of water-column height at this flow rate.

§ 11.124-12 Airflow resistance test; Type C supplied-air respirator, continuous flow class and Type CE supplied-air respirator; minimum requirements.

The resistance to air flowing from the respirator shall not exceed 25 mm. (1 inch) of water-column height when the air flow into the respiratory-inlet covering is 115 liters (4 cubic feet) per minute.

§ 11.124-13 Airflow resistance test; Type C supplied-air respirator, demand class; minimum requirements.

(a) Inhalation resistance shall not exceed 50 millimeters (2 inches) of water at an air flow of 115 liters (4 cubic feet) per minute.

(b) The exhalation resistance to a flow of air at a rate of 85 liters (3 cubic feet) per minute shall not exceed 25 millimeters (1 inch) of water.

§ 11.124-14 Airflow resistance test; Type C supplied-air respirator, pressure-demand class; minimum requirements.

(a) The static pressure in the facepiece shall not exceed 38 mm. (1.5 inches) of water-column height.

(b) The pressure in the facepiece shall not fall below atmospheric at inhalation airflows less than 115 liters (4 cubic feet) per minute.

(c) The exhalation resistance to a flow of air at a rate of 85 liters (3 cubic feet) per minute shall not exceed the static pressure in the facepiece by more than 51 mm. (2 inches) of water-column height.

§ 11.124-15 Exhalation valve leakage test.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm. water-column height while in a normal operating position.

(b) Leakage between the valve and valve seat shall not exceed 30 milliliters per minute.

§ 11.124-16 Man tests for gases and vapors; supplied-air respirators; general performance requirements.

(a) Wearers will enter a chamber containing a gas or vapor as prescribed in §§ 11.124-17, 11.124-18, 11.124-19, and 11.124-20.

(b) Each wearer will spend 10 minutes in work to provide observations on freedom of the device from leakage. The freedom and comfort allowed the wearer will also be considered.

(c) Time during the test period will be divided as follows:

(1) *Five minutes.* Walking, turning head, dipping chin; and

(2) *Five minutes.* Pumping air with a tire pump into a 28-liter (1 cubic foot) container, or equivalent work.

(d) No odor of the test gas or vapor shall be detected by the wearer in the air breathed during any such test, and the wearer shall not be subjected to any undue discomfort or encumbrance because of the fit, air delivery, or other features of the respirator during the testing period.

§ 11.124-17 Man test for gases and vapors; Type A and Type AE respirators; test requirements.

(a) The completely assembled respirator will be worn in a chamber containing 0.1±0.025 percent isoamyl acetate vapor, and the blower, the intake of the hose, and not more than 25 percent of the hose length will be located in isoamyl acetate-free air.

(b) The man in the isoamyl acetate atmosphere will draw his inspired air through the hose, connections, and all parts of the air device by means of his lungs alone (blower not operating).

(c) The 10-minute work test will be repeated with the blower in operation at any practical speed up to 50 revolutions of the crank per minute.

§ 11.124-18 Man test for gases and vapors; Type B and Type BE respirators; test requirements.

(a) The completely assembled respirator will be worn in a chamber containing 0.1±0.025 percent isoamyl acetate vapor, and the intake of the hose, and not more than 25 percent of the hose length will be located in isoamyl acetate-free air.

(b) The man in the isoamyl acetate atmosphere will draw his inspired air through the hose and connections by means of his lungs alone.

§ 11.124-19 Man test for gases and vapors; Type C respirators, continuous-flow class and Type CE supplied-air respirators; test requirements.

(a) The completely assembled respirator will be worn in a chamber containing 0.1±0.025 percent isoamyl acetate vapor, the intake of the hose will be connected to a suitable source of respirable air, and not more than 25 percent of the hose length will be located in isoamyl acetate-free air.

(b) The minimum flow of air required to maintain a positive pressure in the respiratory-inlet covering throughout the entire breathing cycle will be supplied to the wearer, provided however, that airflow shall not be less than 115 liters per minute for tight-fitting and not less than 170 liters per minute for loose-fitting respiratory inlet-coverings.

(c) The test will be repeated with the maximum rate of flow attainable within specified operating pressures.

§ 11.124-20 Man test for gases and vapors; Type C supplied-air respirators, demand and pressure-demand classes; test requirements.

(a) The completely assembled respirator will be worn in a chamber containing 0.1±0.025 percent isoamyl acetate vapor, the intake of the hose will be connected to a suitable source of respirable air, and not more than 25 percent of the hose length will be located in isoamyl acetate free air.

(b) The test will be conducted at the minimum pressure with the maximum hose length and will be repeated at the maximum pressure with the minimum hose length.

§ 11.124-21 Tests for protection during abrasive blasting; Type AE, Type BE, and Type CE supplied-air respirators; general performance requirements.

(a) Tests will be made under conditions of typical abrasive blasting operation.

(b) The tests prescribed in §§ 11.124-22, 11.124-23, and 11.124-24 will be conducted under the following conditions:

(1) A suction-feed abrasive blasting outfit will be used by the wearer;

(2) The diameter of the air jet shall be 5 mm. (3/16 inch);

(3) Air pressure will be 276-483 kN/m.^{2} (40-70 pounds per square inch);

(4) The abrasive used will contain a composition of 99+ percent free silica (SiO_2);

(5) The size properties of the abrasive used will be a mixture of 90 percent by weight of essentially No. 1 sandblast sand and 10 percent air-floated fines; and

(6) The No. 1 sand used will meet a size specification of not more than 10 percent on a 20-mesh sieve and not more than 10 percent through a 35-mesh sieve; 99+ percent of the fines will be able to pass through a 270-mesh sieve. All size determinations will be made by standard-mesh sieves.

(c) Tests will be conducted for 30 minutes continuously.

(d) (1) The person wearing the respirator will sandblast the inside surface of a common iron kettle of approximate hemispherical shape (about 76 cm. (30 inches) in diameter, and 113.6 liters (30 gallons) capacity).

(2) The kettle will be placed with the plane of the opening inclined 45° from a vertical position and with the lowest point of the rim at about the height of the person's hips.

(3) The wearer will stand at one position in front of the kettle and lean over until the upper part of the body is inclined to parallel the face of the kettle.

(4) The wearer will blast the entire inner surface of the kettle with the blast at all times directed approximately at right angles to the surface with the nozzle of the gun approximately 15 cm. (6 inches) from the surface, and with his head approximately 46 cm. (18 inches) from the nozzle.

(5) The wearer will move his head forward, backward, and sideways during each blasting operation.

(e)(1) Air will be withdrawn continuously during the test at the rate of 32 liters (1.13 cubic feet) per minute from the respiratory-inlet covering at a point as near as convenient to the wearer's nostrils.

(2) Simultaneously air will be drawn at the same rate from the source of intake air to the respirator.

(f) Respirators tested in accordance with §§ 11.124-22, 11.124-23, and

11.124-24 shall meet the following minimum requirements:

(1) The amount of particulate matter in the air withdrawn from the respiratory-inlet covering shall not exceed the amount of particulate matter supplied to the respirator by more than 0.5 mg. for the 30-minute test period;

(2) The wearer of the respirator in this test shall not experience undue encumbrance and discomfort because of the fit, air delivery, or other features of the respirator; and,

(3) The head and shoulder covering shall adequately protect the wearer from discomfort or injury due to impact or abrasion from the rebounding material during the test.

§ 11.124-22 Test for protection during abrasive blasting; Type AE supplied-air respirator; test requirements.

(a) The respirator will be arranged as prescribed in § 11.124-17(a), and the tests prescribed in § 11.124-21 will be performed.

(b) The wearer will draw his inspired air through the hose, connections, and all parts of the air device by means of his lungs alone (blower not operating).

(c) The test will be repeated with the blower in operation at any practical speed up to 50 revolutions per minute of the crank.

§ 11.124-23 Test for protection during abrasive blasting; Type BE supplied-air respirator; test requirements.

(a) The respirator will be arranged as prescribed in § 11.124-18(a), and the tests prescribed in § 11.124-21 will be performed.

(b) The wearer will draw his inspired air through the hose, connections, and all parts of the air device by means of his lungs alone.

§ 11.124-24 Test for protection during abrasive blasting; Type CE supplied-air respirator; test requirements.

(a) The respirator will be arranged as prescribed in § 11.124-19(a), and the tests prescribed in § 11.124-21 will be performed.

Subpart K—Dust, Fume, and Mist Respirators

§ 11.130 Dust, fume, and mist respirators; description.

Dust, fume, and mist respirators, including all completely assembled respirators designed for use as respiratory protection during entry into and escape from hazardous particulate atmospheres which contain adequate oxygen to support life, are described as follows:

(a) Respirators, either with replaceable or reusable filters, designed as respiratory protection against dusts (1) having an air contamination level not less than 0.05 milligram per cubic meter of air, including but not limited to coal, arsenic, cadmium, chromium, lead, and manganese; or (2) dusts having an air contamination level not less than 2 million particles per cubic foot of air, including but not limited to aluminum, flour, iron ore, and free silica, resulting principally from the disintegration of a solid, e.g., dust clouds produced in mining, quarrying, and tunneling, and in dusts produced during industrial operations, such as grinding, crushing, and the general processing of minerals and other materials.

(b) Respirators, with replaceable filters, designed as respiratory protection against fumes of various metals having an air contamination level not less than 0.05 milligram per cubic meter, including but not limited to aluminum, antimony, arsenic, cadmium, chromium, copper, iron, lead, magnesium, manganese, mercury (except mercury vapor), and zinc, which result from the sublimation or condensation of their respective vapors, or from the chemical reaction between their respective vapors and gases.

(c) Respirators, with replaceable filters, designed as respiratory protection against mists of materials having an air contamination level not less than 0.05 milligram per cubic meter or 2 million particles per cubic foot, e.g., mists produced by spray coating with vitreous enamels, chromic acid mist produced during chromium plating, and other mists of materials whose liquid vehicle does not produce harmful gases or vapors.

(d) Respirators, with replaceable filters, designed as respiratory protection against dusts, fumes, and mists having an air contamination level less than 0.05 milligram per cubic meter, including but not limited to lithium hydride and beryllium, and against radionuclides.

(e) Respirators, with replaceable filters, designed as respiratory protection against radon daughters, and radon daughters attached to dusts, fumes, and mists.

(f) Respirators, with replaceable filters, designed as respiratory protection against asbestos-containing dusts and mists.

(g) Respirators, with replaceable filters, designed as protection against various combinations of particulate matter.

(h) Single-use dust respirators designed as respiratory protection against pneumoconiosis- and fibrosis-producing dusts, or dusts and mists, including but not limited to aluminum, asbestos, coal, flour, iron ore, and free silica.

(i) The types of dust, fume, and mist respirators in paragraphs (a) through (g) of this section may also be classified according to their design as follows:

(1) Air-purifying respirators; and

(2) Powered air-purifying respirators.

§ 11.131 Dust, fume and mist respirators; required components.

(a) Each dust, fume, and mist respirator described in § 11.130 shall, where its design requires, contain the following component parts:

(1) Facepiece, mouthpiece with noseclip, hood, or helmet;

(2) Filter unit;

(3) Harness;

(4) Attached blower; and

(5) Breathing tube.

(b) The components of each dust, fume, and mist respirator shall meet the minimum construction requirements set forth in Subpart G of this part.

§ 11.132 Breathing tubes; minimum requirements.

(a) Flexible breathing tubes used in conjunction with respirators shall be designed and constructed to prevent:

(1) Restriction of free head movement;

(2) Disturbance of the fit of facepieces, mouthpieces, hoods, or helmets;

(3) Interference with the wearer's activities; and

(4) Shutoff of airflow due to kinking, or from chin or arm pressure.

§ 11.133 Harnesses; installation and construction; minimum requirements.

(a) Each respirator shall, where necessary, be equipped with a suitable harness designed and constructed to hold the components of the respirator in position against the wearer's body.

(b) Harnesses shall be designed and constructed to permit easy removal and replacement of respirator parts, and, where applicable, provide for holding a full facepiece in the ready position when not in use.

§ 11.134 Respirator containers; minimum requirements.

(a) Except as provided in paragraph (b) of this section each respirator shall be equipped with a substantial, durable container bearing markings which show the applicant's name, the type of respirator it contains, and all appropriate approval labels.

(b) Containers for single-use respirators may provide for storage of more than one respirator, however, such containers shall be designed and constructed to prevent contamination of respirators which are not removed, and to prevent damage to respirators during transit.

§ 11.135 Half-mask facepieces, full facepieces, hoods, helmets, and mouthpieces; fit; minimum requirements.

(a) Half-mask facepieces and full facepieces shall be designed and constructed to fit persons with various facial shapes and sizes either: (1) By providing more than one facepiece size, or (2) by providing one facepiece size which will fit varying facial shapes and sizes.

(b) Full facepieces shall provide for optional use of corrective spectacles or lenses, which shall not reduce the respiratory protective qualities of the respirator.

(c) Hoods and helmets shall be designed and constructed to fit persons with various head sizes, provide for the optional use of corrective spectacles or lenses, and insure against any restriction of movement by the wearer.

(d) Mouthpieces shall be equipped with noseclips which are securely attached to the mouthpiece or respirator and provide an airtight seal.

(e) Facepieces, hoods, and helmets shall be designed to prevent eyepiece fogging.

(f) Half-mask facepieces shall not interfere with the fit of common industrial safety corrective spectacles, as determined by the Institute's facepiece tests in §§ 11.140-1 and 11.140-2.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.136 Facepieces, hoods, and helmets; eyepieces; minimum requirements.

Facepieces, hoods, and helmets shall be designed and constructed to provide adequate vision which is not distorted by the eyepieces.

§ 11.137 Inhalation and exhalation valves; minimum requirements.

(a) Inhalation and exhalation valves shall be protected against distortion.

(b) Inhalation valves shall be designed and constructed and provided where necessary to prevent excessive exhaled air from adversely affecting filters, except where filters are specifically designed to resist moisture as prescribed in § 11.140-5.

(c) Exhalation valves shall be: (1) Provided where necessary; (2) protected against damage and external influence; and (3) designed and constructed to prevent inward leakage of contaminated air.

§ 11.138 Head harnesses; minimum requirements.

(a) All facepieces shall be equipped with head harnesses designed and constructed to provide adequate tension during use and an even distribution of pressure over the entire area in contact with the face.

(b) Facepiece head harnesses, except those employed on single-use respirators, shall be adjustable and replaceable.

(c) Mouthpieces shall be equipped, where applicable, with adjustable and replaceable harnesses, designed and constructed to hold the mouthpiece in place.

§ 11.139 Air velocity and noise levels; hoods and helmets; minimum requirements.

Noise levels generated by the respirator will be measured inside the hood or helmet at maximum airflow obtainable and shall not exceed 80 dBA.

§ 11.140 Dust, fume, and mist respirators; performance requirements; general.

Dust, fume, and mist respirators and the individual components of each such device shall, as appropriate, meet the requirements for performance and protection specified in the tests described in §§ 11.140-1 through 11.140-12 and prescribed in Tables 9 and 10.

§ 11.140-1 Isoamyl acetate tightness test; dust, fume, and mist respirators designed for respiratory protection against fumes of various metals having an air contamination level not less than 0.05 milligram per cubic meter; minimum requirements.

(a) The respirator will be modified in such a manner that all of the air that normally would be inhaled through the inhalation port(s) is drawn through an efficient activated charcoal-filled canister, or cartridge(s), without interference with the face-contacting portion of the facepiece.

(b) The modified respirator will be worn by persons for at least 2 minutes each in a test chamber containing 100 parts (by volume) of isoamyl-acetate vapor per million parts of air.

(c) The odor of isoamyl-acetate shall not be detected by the wearers of the modified respirator while in the test atmosphere.

§ 11.140-2 Isoamyl acetate tightness test; respirators designed for respiratory protection against dusts, fumes, and mists having an air contamination level less than 0.05 milligram per cubic meter, or against radionuclides; minimum requirements.

(a) The applicant shall provide a charcoal-filled canister or cartridge of a size and resistance similar to the filter unit with connectors which can be attached to the facepiece in the same manner as the filter unit.

(b)(1) The canister or cartridge will be used in place of the filter unit, and persons will each wear a modified half-mask facepiece for 5 minutes in a test chamber containing 100 parts (by volume) of isoamyl-acetate vapor per million parts of air.

(2) The following work schedule will be performed by each wearer in the test chamber:

(i) Two minutes walking, nodding, and shaking head in normal movements; and

(ii) Three minutes exercising and running in place.

(3) The facepiece shall be capable of adjustment, according to the applicant's instructions, to each wearer's face, and the odor of isoamyl-acetate shall not be detectable by any wearer during the test.

(c) Where the respirator is equipped with a full facepiece, hood, helmet, or mouthpiece, the canister or cartridge will be used in place of the filter unit, and persons will each wear the modified respiratory-inlet covering for 5 minutes in a test chamber containing 1,000 parts (by volume) of isoamyl-acetate vapor per million parts of air, performing the work schedule specified in paragraph (b)(2) of this section.

§ 11.140-3 Air-purifying filter tests; performance requirements; general.

Dust, fume, and mist respirators will be tested in accordance with the schedule set forth in Table 10 to determine their effectiveness as protection against the particulate hazards specified therein.

§ 11.140-4 Silica dust test; single-use or reuseable filters; minimum requirements.

(a) Three respirators with single-use filters will be tested for periods of 90 minutes each at a continuous airflow rate of 32 liters per minute for air-purifying respirators, and for periods of 4 hours each at a flowrate not less than 115 liters per minute to tight-fitting facepieces, and not less than 170 liters per minute to loose-fitting hoods and helmets for powered air-purifying respirators.

(b) The relative humidity in the test chamber will be 20-80 percent, and the room temperature approximately 25° C.

(c) The test suspension in the chamber will not be less than 50 nor more than 60 milligrams of flint (99+ percent free silica) per cubic meter of air.

(d) The flint in suspension will be ground to pass 99+ percent through a 270-mesh sieve.

(e) The particle-size distribution of the test suspension will have a geometric mean of 0.4 to 0.6 micrometer, and the standard geometric deviation will not exceed 2.

(f) The total amount of unretained test suspension in samples taken during testing shall not exceed 1.5 milligrams for an air-purifying respirator, 14.4 milligrams for a powered air-purifying respirator with tight-fitting facepiece, and 21.3 milligrams for a powered air-purifying respirator with loose-fitting hood or helmet.

(g) Three respirators with reusable filters will be tested and shall meet the requirements specified in paragraphs (a) through (f) of this section; each filter shall be tested three times: Once as received; once after cleaning; and once after recleaning. The applicant's instructions shall be followed for each cleaning.

§ 11.140-5 Silica-dust test; single-use dust respirators; minimum requirements.

(a) Three respirators will be tested.

(b) As described in § 11.140-4, airflow will be cycled through the respirator by a breathing machine at the rate of 24 respirations per minute with a minute volume of 40 liters; a breathing machine cam with a work rate of 622 kg.-m.²/minute shall be used.

(c) Air exhaled through the respirator will be 35° ± 2° C. (95° ± 3° F.) with 94 ± 3 percent relative humidity.

(d) Air inhaled through the respirator will be sampled and analyzed for respirator leakage.

(e) The total amount of unretained test suspension, after drying, in samples taken during testing, shall not exceed 1.8 milligrams for any single test.

§ 11.140-6 Lead fume test; minimum requirements.

(a) Three respirators will be tested for a period of 312 minutes each at a continuous airflow rate of 32 liters per minute for air-purifying respirators, and for periods of 4 hours each at a flow rate not less than 115 liters per minute to tight-fitting facepieces, and not less than 170 liters per minute to loose-fitting hoods and helmets for powered air-purifying respirators.

(b) The relative humidity in the test chamber will be 20-80 percent, and the room temperature approximately 25° C.

(c) The test suspension in the test chamber will not be less than 15 nor more than 20 milligrams of freshly generated lead-oxide fume, calculated as lead (Pb), per cubic meter of air.

(d) The fume will be generated by impinging an oxygen-gas flame on molten lead.

(e) Samples of the test suspension will be taken during each test period for analysis.

(f) The total amount of unretained test suspension in the samples taken during testing, which is analyzed and calculated as lead (Pb), shall not exceed 1.5 milligrams of lead for an air-purifying respirator, 4.2 milligrams of lead for a powered air-purifying respirator with tight-fitting facepiece, and 6.2 milligrams of lead for a powered air-purifying respirator with loose-fitting hood or helmet.

§ 11.140-7 Silica mist test; minimum requirements.

(a) Three respirators will be tested for a period of 312 minutes each at a continuous airflow rate of 32 liters per minute for air-purifying respirators, and for periods of 4 hours each at a flow rate not less than 115 liters per minute to tight-fitting facepieces, and not less than 170 liters per minute to loose-fitting hoods and helmets for powered air-purifying respirators.

(b) The room temperature in the test chamber will be approximately 25° C.

(c) The test suspension in the test chamber will not be less than 20 nor more than 25 milligrams of silica mist, weighed as silica dust, per cubic meter of air.

(d) Mist will be produced by spraying an aqueous suspension of flint (99+ percent free silica), and the flint shall be ground to pass 99+ percent through a 270-mesh sieve.

(e) Samples of the test suspension will be taken during each test period for analysis.

(f) The total amount of silica mist unretained in the samples taken during testing, weighed as silica dust, shall not exceed 2.5 milligrams for an air-purifying respirator, 6.9 milligrams for a powered air-purifying respirator with tight-fitting facepiece, and 10.2 milligrams for a powered air-purifying respirator with loose-fitting hood or helmet.

§ 11.140-8 Tests for respirators designed for respiratory protection against more than one type of dispersoid; minimum requirements.

Respirators designed as respiratory protection against more than one particulate hazard (dust, fume, or mist) shall comply with all the requirements of this part, with respect to each of the specific hazards involved.

§ 11.140-9 Airflow resistance tests; all dust, fume, and mist respirators; minimum requirements.

(a) Resistance to airflow will be measured in the facepiece, mouthpiece, hood, or helmet of a dust, fume, or mist respirator mounted on a test fixture with air flowing at a continuous rate of 85 liters per minute, both before and after each test conducted in accordance with §§ 11.140-4 through 11.140-7.

(b) The maximum allowable resistance requirements for dust, fume, and mist respirators are as follows:

MAXIMUM RESISTANCE

[mm water-column height]

Type of respirator	Initial inhalation	Final inhalation	Exhalation
Single-use	12	15	15
Dust, fume, and mist, with single-use filter	30	50	20
Dust, fume, and mist, with reusable filter	20	40	20
Radon daughter	18	25[1]	15
Asbestos dust and mist	18	25	15

[1] Measured after silica dust test described in § 11.140-4

§ 11.140-10 Exhalation valve leakage test; minimum requirements.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm. water-column height while in a normal operating position.

(b) Leakage between the valve and valve seat shall not exceed 30 milliliters per minute.

§ 11.140-11 DOP filter test; respirators designed as respiratory protection against dusts, fumes, and mists having an air contamination level less than 0.05 milligram per cubic meter and against radionuclides; minimum requirements.

(a) All single air-purifying respirator filter units will be tested in an atmosphere concentration of 100 micrograms of DOP per liter of air at continuous flow rates of 32 and 85 liters per minute for a period of 5 to 10 seconds.

(b) Where filters are to be used in pairs, the flow rates will be 16 and 42.5 liters per minute, respectively, through each filter.

(c) The filter will be mounted on a connector in the same manner as used on the respirator, and the total leakage for the connector and filter shall not exceed 0.03 percent of the ambient DOP concentration at either flow rate.

§ 11.140-12 Silica dust loading test; respirators designed as protection against dusts, fumes, and mists having an air contamination level less than 0.05 milligram per cubic meter and against radionuclides; minimum requirements.

Three respirators will be tested in accordance with the provisions of § 11.140-4 and shall meet the minimum requirements of §§ 11.140-4 and 11.140-9.

TABLE 9—FACEPIECE TEST REQUIREMENTS

[30 CFR Part 11, Subpart K, § 11.140-1, et seq.]

Respirator types	Pressure tightness test[1]	Isoamyl acetate test	
		11.140-1	11.140-2
Dusts: Air Contamination Level not less than 0.05 mg/M^3 or 2 mppcf	X		
Fumes: Air Contamination Level not less than 0.05 mg/M^3	X	X	
Mists: Air Contamination Level not less than 0.05 mg/M^3 or 2 mppcf	X		
Dusts, Fumes, and Mists: Air Contamination Level less than 0.05 mg/M^3 or 2 mppcf, and radionuclides	X		X
Radon daughters	X	X	
Asbestos-containing dusts and mists	X		

[1] Test is required only where applicable.

TABLE 10—AIR-PURIFYING AND POWERED AIR-PURIFYING RESPIRATOR FILTER TESTS REQUIRED FOR APPROVAL

[30 CFR Part 11, Subpart K, § 11.140-4, et seq.]

Respirator types	Silica dust tests			Lead fume test 11.140-6	Silica mist test 11.140-7	DOP test 11.140-11
	11.140-4	11.140-5	11.140-12			
Dusts: Air Contamination Level not less than 0.05 mg/M^3 or 2 mppcf	X					
Fumes: Air Contamination Level not less than 0.05 mg/M^3				X		
Mists: Air Contamination Level not less than 0.05 mg/M^3 or 2 mppcf					X	

TABLE 10—AIR-PURIFYING AND POWERED AIR-PURIFYING RESPIRATOR FILTER TESTS REQUIRED FOR APPROVAL—Continued

[30 CFR Part 11, Subpart K, § 11.140-4, et seq.]

Respirator types	Silica dust tests			Lead fume test 11.140-6	Silica mist test 11.140-7	DOP test 11.140-11
	11.140-4	11.140-5	11.140-12			
Dusts, Fumes, and Mists: Air Contamination Level less than 0.05 mg/M³ or 2 mppcf, and radionuclides			X			X
Radon daughters	[1]X				[2]X	
Asbestos-containing dusts and mists	[2]X				[3]X	
Single use dust and mist respirators		[1]X			[3]X	

[1] For resistance only.

[2] For penetration only.

[3] Test required only where applicable.

Subpart L—Chemical Cartridge Respirators

§ 11.150 Chemical cartridge respirators: description.

Chemical cartridge respirators including all completely assembled respirators which are designed for use as respiratory protection during entry into or escape from atmospheres not immediately dangerous to life and health, are described according to the specific gases or vapors against which they are designed to provide respiratory protection, as follows:

Type of chemical cartridge respirator [1]	Maximum use concentration, parts per million
Ammonia	300
Chlorine	10
Hydrogen chloride	50
Methyl amine	100
Organic vapor	[2]1,000
Sulfur dioxide	50
Vinyl chloride	10

[1] Not for use against gases or vapors with poor warning properties (except where MSHA or Occupational Safety and Health Administration standards may permit such use for a specific gas or vapor) or those which generate high heats of reaction with sorbent material in the cartridge.

[2] Maximum use concentrations are lower for organic vapors which produce atmospheres immediately hazardous to life or health at concentrations equal to or lower than this concentration.

NOTE: Chemical cartridge respirators for respiratory protection against gases or vapors, which are not specifically listed with their maximum use concentration except pesticides, may be approved if the applicant submits a request for such approval, in writing, to the Institute. MSHA and the Institute shall consider each such application and accept or reject the application after a review of the effects on the wearer's health and safety and in the light of any field experience in use of chemical cartridge respirators as protection against such hazards.

[37 FR 6242, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973; 42 FR 65167, Dec. 30, 1977]

§ 11.151 Chemical cartridge respirators; required components.

(a) Each chemical cartridge respirator described in § 11.150 shall, where its design requires, contain the following component parts:

(1) Facepiece, mouthpiece, and noseclip, hood, or helmet;

(2) Cartridge;

(3) Cartridge with filter;

(4) Harness;

(5) Breathing tube; and

(6) Attached blower.

(b) The components of each chemical cartridge respirator shall meet the minimum construction requirements set forth in Subpart G of this part.

§ 11.152 Cartridges in parallel; resistance requirements.

Where two or more cartridges are used in parallel, their resistance to airflow shall be essentially equal.

§ 11.153 Cartridges; color and markings; requirements.

The color and markings of all cartridges or labels shall conform with the requirements of the American National Standard for Identification of Gas Mask Canisters, K13.1, obtainable from American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

§ 11.154 Filters used with chemical cartridges; location; replacement.

(a) Particulate matter filters used in conjunction with a chemical cartridge shall be located on the inlet side of the cartridge.

(b) Filters shall be incorporated in or firmly attached to the cartridge and each filter assembly shall, where applicable, be designed to permit its easy removal from and replacement on the cartridge.

§ 11.155 Breathing tubes; minimum requirements.

(a) Flexible breathing tubes used in conjunction with respirators shall be designed and constructed to prevent:

(1) Restriction of free head movement;

(2) Disturbance of the fit of facepieces, mouthpieces, hoods, or helmets;

(3) Interference with the wearer's activities; and

(4) Shutoff of airflow due to kinking, or from chin or arm pressure.

§ 11.156 Harnesses; installation and construction; minimum requirements.

(a) Each respirator shall, where necessary, be equipped with a suitable harness designed and constructed to hold the components of the respirator in position against the wearer's body.

(b) Harnesses shall be designed and constructed to permit easy removal and replacement of respirator parts and, where applicable, provide for holding a full facepiece in the ready position when not in use.

§ 11.157 Respirator containers; minimum requirements.

Respirators shall be equipped with a substantial, durable container bearing markings which show the applicant's name, the type and commercial designation of the respirator it contains and all appropriate approval labels.

§ 11.158 Half-mask facepieces, full facepieces, mouthpieces, hoods, and helmets; fit; minimum requirements.

(a) Half-mask facepieces and full facepieces shall be designed and constructed to fit persons with various facial shapes and sizes either: (1) By providing more than one facepiece size, or (2) by providing one facepiece size which will fit varying facial shapes and sizes.

(b) Hoods and helmets shall be designed and constructed to fit persons with various head sizes, provide for the optional use of corrective spectacles or lenses, and insure against any restriction of movement by the wearer.

(c) Mouthpieces shall be equipped with noseclips which are securely attached to the mouthpiece or respirator and provide an airtight fit.

(d) Full facepieces shall provide for optional use of corrective spectacles or lenses which shall not reduce the respiratory protective qualities of the respirator.

(e) Facepieces, hoods, and helmets shall be designed to prevent eyepiece fogging.

§ 11.158-1 Facepieces, hoods, and helmets; eyepieces; minimum requirements.

Facepieces, hoods, and helmets shall be designed and constructed to provide adequate vision which is not distorted by the eyepieces.

§ 11.159 Inhalation and exhalation valves; minimum requirements.

(a) Inhalation and exhalation valves shall be provided where necessary and protected against distortion.

(b) Inhalation valves shall be designed and constructed to prevent excessive exhaled air from entering cartridges or adversely affecting canisters.

(c) Exhalation valves shall be: (1) Protected against damage and external influence, and (2) designed and constructed to prevent inward leakage of contaminated air.

§ 11.160 Head harnesses; minimum requirements.

(a) Facepieces for chemical cartridge respirators other than single-use vinyl chloride shall be equipped with adjustable and replaceable head harnesses designed and constructed to provide adequate tension during use and an even distribution of pressure over the entire area in contact with the face.

(a-1) Facepieces for single-use vinyl chloride respirators shall be equipped with adjustable head harnesses designed and constructed to provide adequate tension during use and an even distribution of pressure over the entire area in contact with the face.

(b) Mouthpieces shall be equipped where applicable, with an adjustable and replaceable harness designed and constructed to hold the mouthpiece in place.

[37 FR 6244, Mar. 25, 1972, as amended at 42 FR 65167, Dec. 30, 1977]

§ 11.161 Air velocity and noise levels; hoods and helmets; minimum requirements.

Noise levels generated by the respirator will be measured inside the hood or helmet at maximum airflow obtainable and shall not exceed 80 dBA.

§ 11.162 Chemical cartridge respirators; performance requirements; general.

Chemical cartridge respirators and the individual components of each such device shall, as appropriate, meet the minimum requirements for performance and protection specified in the tests described in §§ 11.162-1 through 11.162-8.

§ 11.162-1 Breathing resistance test; minimum requirements.

(a) Resistance to airflow will be measured in the facepiece, mouthpiece, hood, or helmet of a chemical cartridge respirator mounted on a test fixture with air flowing at a continuous rate of 85 liters per minute, both before and after each test conducted in accordance with §§ 11.162-5 through 11.162-8.

(b) The maximum allowable resistance requirements for chemical cartridge respirators are as follows:

MAXIMUM RESISTANCE

[Millimeter water column height]

Type of chemical-cartridge respirator	Inhalation		Exhalation
	Initial	Final [1]	
Other than single-use vinyl chloride respirators:			
For gases, vapors, or gases and vapors	40	45	20
For gases, vapors, or gases and vapors, and dusts, fumes, and mists	50	70	20
For gases, vapors, or gases and vapors, and mists of paints, lacquers, and enamels	50	70	20
Single-use respirator with valves:			
For vinyl chloride	20	25	20
For vinyl chloride and pneumoconiosis and fibrosis producing dusts	30	45	20
Single-use respirator without valves:			
For vinyl choride	15	20	(2)
For vinyl chloride and pneumoconiosis and fibrosis producing dusts	25	40	(2)

[1] Measured at end of service life specified in Table 11 and 11a.

[2] Same as inhalation.

[37 FR 6244, Mar. 25, 1972, as amended at 42 FR 65167, Dec. 30, 1977]

§ 11.162-2 Exhalation valve leakage test; minimum requirements.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm. water-column height while in a normal operating position.

(b) Leakage between the valve and valve seat shall not exceed 30 milliliters per minute.

§ 11.162-3 Facepiece test; minimum requirements.

(a) The complete chemical cartridge respirator will be fitted to the faces of persons having varying facial shapes and sizes.

(b) Where the applicant specifies a facepiece size or sizes for the respirator together with the approximate measurement of faces they are designed to fit, the Institute will provide test subjects to suit such facial measurements.

(c) Any chemical cartridge respirator part which must be removed to perform the facepiece or mouthpiece fit test shall be replaceable without special tools and without disturbing facepiece or mouthpiece fit.

(d) The facepiece or mouthpiece fit test using the positive or negative pressure recommended by the applicant and described in his instructions will be used before each test.

(e) (1) Each wearer will enter a chamber containing 100 p.p.m. isoamyl acetate vapor for half-mask facepieces, and 1,000 p.p.m. for full facepieces, mouthpieces, hoods, and helmets.

(2) The facepiece or mouthpiece may be adjusted, if necessary, in the test chamber before starting the test.

(3) Each wearer will remain in the chamber for 8 minutes while performing the following activities:

(i) Two minutes, nodding and turning head;

(ii) Two minutes, calisthenic arm movements;

(iii) Two minutes, running in place; and

(iv) Two minutes, pumping with a tire pump into a 28-liter (1 cubic-foot) container.

(4) Each wearer shall not detect the odor of isoamyl-acetate vapor during the test.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.162-4 Lacquer and enamel mist tests; respirators with filters; minimum requirements; general.

(a) Three respirators with cartridges containing or having attached to them, filters for protection against mists of paints, lacquers, and enamels shall be tested in accordance with the provisions of § 11.162-8.

(b) In addition to the test requirements set forth in paragraph (a) of this section, three such respirators will be tested against each aerosol in accordance with the provisions of §§ 11.162-5 and 11.162-6.

§ 11.162-5 Lacquer mist test; minimum requirements.

(a) Temperature in the test chamber will be approximately 25° C.

(b) Continuous airflow through the respirator will be 32 liters per minute for air-purifying respirators, and not less than 115 liters per minute to tight fitting facepieces and 170 liters per minute to loose-fitting hoods and helmets of powered air-purifying respirators.

(c) Airflow through the chamber will be 20-25 air changes per minute.

(d) The atomizer employed will be a No. 64-5 nozzle with setup 3, or equivalent, operating at 69 $kN/m.^2$ (10 pounds per square inch gage).

(e) The test aerosol will be prepared by atomizing a mixture of one volume of clear cellulose nitrate lacquer and one volume of lacquer thinner.

(f) The lacquer used will conform essentially to Federal Specification TT-L-31, October 7, 1953.

(g) The concentration of cellulose nitrate in the test aerosol will be 95-125 milligrams per cubic meter.

(h) The test aerosol will be drawn to each respirator for a total of 156 minutes for air-purifying respirators and 240 minutes for powered air-purifying respirators.

(i) The total amount of unretained mist in the samples taken during testing, weighed as cellulose nitrate, shall not exceed 5 milligrams for an air-purifying respirator, 28 milligrams for a powered air-purifying respirator with tight-fitting facepiece, and 41 milligrams for a powered air-purifying respirator with loose-fitting hood or helmet.

§ 11.162-6 Enamel mist test; minimum requirements.

(a) Temperature in the test chamber will be approximately 25° C.

(b) Continuous airflow through the respirator will be 32 liters per minute for air-purifying respirators, and not less than 115 liters per minute to tight-fitting facepieces and 170 liters per minute to loose-fitting hoods and helmets of powered air-purifying respirators.

(c) Airflow through the chamber will be 20-25 air changes per minute.

(d) The atomizer employed will be a No. 64 nozzle with setup 1A, or equivalent, operating at 69 kN/m.^{2} (10 pounds per square inch gage).

(e) The test aerosol will be prepared by atomizing a mixture of 1 volume of white enamel and 1 volume of turpentine.

(f) The enamel used will conform essentially to Federal Specification TT-E-489b, May 12, 1953 (an enamel having a phthalic alkyd resin vehicle and a titanium dioxide pigment).

(g) The concentration of pigment in the test aerosol, weighed as ash, will be 95-125 milligrams per cubic meter.

(h) The test aerosol will be drawn to each respirator for a total of 156 minutes for air-purifying respirators and 240 minutes for power air-purifying respirators.

(i) The total amount of unretained mist in the samples taken during testing, weighed as ash, shall not exceed 1.5 milligrams for any air-purifying respirator, 8.3 milligrams for a powered air-purifying respirator with tight-fitting facepiece, and 12.3 milligrams for a powered air-purifying respirator with loose-fitting hood or helmet.

§ 11.162-7 Dust, fume, and mist tests; respirators with filters; minimum requirements; general.

(a) Three respirators with cartridges containing, or having attached to them, filters for protection against dusts, fumes, and mists, except the mists of paints, lacquers, and enamels, will be tested in accordance with the provisions of § 11.162-8.

(b) In addition to the test requirements set forth in paragraph (a) of this section, three such respirators will be tested, as appropriate, in accordance with the provisions of §§ 11.140-1 through 11.140-14; however, the maximum allowable resistance of complete dust, fume, and mist, and gas, vapor, or gas and vapor chemical cartridge respirators shall not exceed the maximum allowable limits set forth in § 11.162-1.

§ 11.162-8 Bench tests; gas and vapor tests; minimum requirements; general.

(a) Bench tests will be made on an apparatus that allows the test atmosphere at 50 ±5 percent relative humidity and room temperature, approximately 25° C., to enter the cartridges continuously at predetermined concentrations and rates of flow, and that has means for determining the test life of the cartridges.

(b) Where two cartridges are used in parallel on a chemical cartridge respirator, the bench test will be performed with the cartridges arranged in parallel, and the test requirements will apply to the combination rather than to the individual cartridges.

(c) Three cartridges or pairs of cartridges will be removed from containers and tested as received from the applicant.

(d) Two cartridges or pairs of cartridges will be equilibrated at room temperature by passing 25 percent relative humidity air through them at the following flow rates (expressed in liters per minute (l.p.m.)) for 6 hours:

Type of cartridge	Airflow rate, l.p.m.
Air purifying	25
Powered air purifying with tight-fitting facepiece	115
Powered air purifying with loose-fitting hood or helmet	170

(e) Two cartridges or pairs of cartridges will be equilibrated by passing 85 percent relative humidity air through them at the flow rates stated in paragraph (d) of this section.

(f) All cartridges will be resealed, kept in an upright position, at room temperatures, and tested within 18 hours.

(g) Cartridges will be tested and shall meet the minimum requirements set forth in Table 11.

TABLE 11—CARTRIDGE BENCH TESTS AND REQUIREMENTS

[30 CFR Part 11, Subpart L, § 11.162-8]

Cartridge	Test condition	Test atmosphere		Flowrate (l.p.m.)	Number of tests	Penetration [1] (p.p.m.)	Minimum life [2] (min.)
		Gas or vapor	Concentration (p.p.m.)				
Ammonia	As received	NH_3	1000	64	3	50	50
Ammonia	Equilibrated	NH_3	1000	32	4	50	50
Chlorine	As received	Cl_2	500	64	3	5	35
Chlorine	Equilibrated	Cl_2	500	32	4	5	35
Hydrogen chloride	As received	HCl	500	64	3	5	50
Hydrogen chloride	Equilibrated	HCl	500	32	4	5	50
Methylamine	As received	CH_3NH_2	1000	64	3	10	25
Methylamine	Equilibrated	CH_3NH_2	1000	32	4	10	25
Organic vapors	As received	CCl_4	1000	64	3	5	50
Organic vapors	Equilibrated	CCl_4	1000	32	4	5	50
Sulfur dioxide	As received	SO_2	500	64	3	5	30
Sulfur dioxide	Equilibrated	SO_2	500	32	4	5	30

[1] Minimum life will be determined at the indicated penetration.

[2] Where a respirator is designed for respiratory protection against more than one type of gas or vapor, as for use in ammonia and in chlorine, the minimum life shall be one-half that shown for each type of gas or vapor. Where a respirator is designed for respiratory protection against more than one gas of a type, as for use in chlorine and sulfur dioxide, the stated minimal life shall apply.

Subpart M—Pesticide Respirators

§ 11.170 Pesticide respirators; description.

Pesticide respirators, including all completely assembled respirators which are designed for use as respiratory protection during entry into and escape from atmospheres which contain pesticide hazards, are described according to their construction as follows:

(a) Front-mounted or back-mounted gas masks;

(b) Chin-style gas mask;

(c) Chemical cartridge;

(d) Air-purifying respirator with attached blower; and,

(e) Other devices, including combination respirators.

§ 11.171 Pesticide respirators; required components.

(a) Each pesticide respirator described in § 11.170 shall, where its design requires, contain the following component parts:

(1) Facepiece, mouthpiece, and noseclip, helmet, or hood;

(2) Canister with filter;

(3) Cartridge with filter;

(4) Harness;

(5) Attached blower; and,

(6) Breathing tube.

(b) The components of each pesticide respirator shall meet the minimum construction requirements set forth in Subpart G of this part.

§ 11.172 Canisters and cartridges in parallel; resistance requirements.

Where two or more canisters or cartridges are used in parallel, their resistance to airflow shall be essentially equal.

§ 11.173 Canisters and cartridges; color and markings; requirements.

The color and markings of all canisters and cartridges or labels shall conform with the requirements of the American National Standard for Identification of Gas Mask Canisters, ge 7r102.002K13.1.

§ 11.174 Filters used with canisters and cartridges; location; replacement.

(a) Particulate matter filters used in conjunction with a canister or cartridge shall be located on the inlet side of the canister or cartridge.

(b) Filters shall be incorporated into or firmly attached to the canister or cartridge and each filter assembly shall, where applicable, be designed to permit its easy removal from and replacement on the canister or cartridge.

§ 11.175 Breathing tubes; minimum requirements.

(a) Flexible breathing tubes used in conjunction with respirators shall be designed and constructed to prevent:

(1) Restriction of free head movement;

(2) Disturbance of the fit of facepieces, mouthpieces, hoods, or helmets;

(3) Interference with the wearer's activities; and,

(4) Shutoff of airflow due to kinking, or from chin or arm pressure.

§ 11.176 Harnesses; installation and construction; minimum requirements.

(a) Each respirator shall, where necessary, be equipped with a suitable harness designed and constructed to hold the components of the respirator in position against the wearer's body.

(b) Harnesses shall be designed and constructed to permit easy removal and replacement of respirator parts, and, where applicable, provide for holding a full facepiece in the ready position when not in use.

§ 11.177 Respirator containers; minimum requirements.

(a) Respirators shall be equipped with a substantial, durable, container bearing markings which show the applicant's name, type, and commercial designation of the respirator it contains, and all appropriate approval labels.

(b) Containers for gas masks shall be designed and constructed to permit easy removal of the mask.

§ 11.178 Half-mask facepieces, full facepieces, hoods and helmets, and mouthpieces; fit; minimum requirements.

(a) Half-mask facepieces and full facepieces shall be designed and constructed to fit persons with various facial shapes and sizes either: (1) By providing more than one facepiece size, or (2) by providing one facepiece size which will fit varying facial shapes and sizes.

(b) Full facepieces shall provide for optional use of corrective spectacles or lenses, which shall not reduce the respiratory protective quality of the respirator.

(c) Hoods and helmets shall be designed and constructed to fit persons with various head sizes, permit optional use of corrective spectacles without reducing the respiratory protective qualities of the respirator, and insure against any restriction of movement by the wearer.

(d) Pesticide respirators with mouthpieces shall be equipped with noseclips which are securely attached to the mouthpiece or respirator and provide an airtight seal.

(e) Facepieces, hoods, and helmets shall be designed to prevent eyepiece fogging.

(f) Half-mask facepieces shall not interfere with the fit of common industrial safety corrective spectacles as determined by the facepiece tests in § 11.183-3.

§ 11.179 Facepieces, hoods, and helmets; eyepieces; minimum requirements.

(a) Facepieces, hoods, and helmets shall be designed and constructed to provide adequate vision which is not distorted by the eyepiece.

(b) All eyepieces of gas masks shall be designed and constructed to meet the impact and penetration requirements specified in Federal Specification, Mask, Air line: and Respirator, Air Filtering, Industrial, GGG-M-125d, October 11, 1965.

§ 11.180 Inhalation and exhalation valves; minimum requirements.

(a) Inhalation and exhalation valves shall be protected against distortion.

(b) Inhalation valves shall be designed and constructed and provided where necessary to prevent excessive exhaled air from adversely affecting cartridges, canisters, and filters.

(c) Exhalation valves shall be:

(1) Provided where necessary;

(2) Protected against damage and external influence; and,

(3) Designed and constructed to prevent inward leakage of contaminated air.

§ 11.181 Head harnesses; minimum requirements.

(a) Facepieces shall be equipped with adjustable and replaceable head harnesses designed and constructed to provide adequate tension during use and an even distribution of pressure over the entire area in contact with the face.

(b) Mouthpieces shall be equipped, where applicable, with adjustable and replaceable harnesses designed and constructed to hold the mouthpiece in place.

§ 11.182 Air velocity and noise levels; hoods and helmets; minimum requirements.

Noise levels generated by the respirator will be measured inside the hood or helmet at maximum obtainable airflow and shall not exceed 80 dBA.

§ 11.183 Pesticide respirators; performance requirements; general.

Pesticide respirators and the individual components of each such device shall, as appropriate, meet the requirements for performance and protection specified in the tests described in §§ 11.183-1 through 11.183-7.

§ 11.183-1 Breathing resistance test; minimum requirements.

(a) Airflow resistance will be measured in the facepiece, mouthpiece, hood, or helmet of a pesticide respirator mounted on a test fixture with air flowing at a continuous rate of 85 liters per minute, both before and after each test conducted in accordance with §§ 11.183-4 and 11.183-7.

(b) The maximum allowable resistance requirements for pesticide respirators are as follows:

MAXIMUM RESISTANCE

[mm water-column height]

Type of pesticide respirator	Inhalation		Exhalation
	Initial	Final [1]	
Front or back-mounted gas mask	70	85	20
Chin-style gas mask	65	80	20
Powered air purifying	[2]50	[2]70	[2]20
Chemical cartridge	50	70	20

[1] Measured at end of the service life specified in Table 12

[2] Resistance of filter(s), cartridge(s), and breathing tube(s) only with blower not operating

§ 11.183-2 Exhalation valve leakage test; minimum requirements.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm. water-column height while in a normal operating position.

(b) Leakage between the valve and valve seat shall not exceed 30 milliliters per minute.

§ 11.183-3 Facepiece test; minimum requirements.

(a) The complete pesticide respirator will be fitted to the faces of persons having varying facial shapes and sizes.

(b) Where the applicant specifies a facepiece size or sizes for his respirator together with the approximate measurements of faces they are designed to fit, the Institute will provide test subjects to suit such facial measurements.

(c) Any pesticide respirator part which must be removed to perform the facepiece fit test shall be replaceable without special tools and without disturbing facepiece fit.

(d) The facepiece or mouthpiece fit test using positive or negative pressure recommended by the applicant and described in his instructions will be used during each test.

(e)(1) Each wearer will enter a chamber containing 1,000 p.p.m. isoamyl-acetate vapor for a respirator equipped with a full facepiece, mouthpiece, hood, or helmet and 100 p.p.m. isoamyl-acetate vapor for a respirator equipped with a half-mask facepiece.

(2) The facepiece, mouthpiece, hood, or helmet may be adjusted, if necessary, in the test chamber before starting the test.

(3) Each wearer will remain in the chamber while performing the following activities:

(i) Two minutes, nodding and turning head;

(ii) Two minutes, calisthenic arm movements;

(iii) Two minutes, running in place; and,

(iv) Two minutes, pumping with a tire pump into a 28-liter (1 cubic foot) container.

(4) Each wearer shall not detect the odor of isoamyl-acetate during the test.

[37 FR 6244, Mar. 25, 1972, as amended at 38 FR 6993, Mar. 15, 1973]

§ 11.183-4 Silica dust test; minimum requirements.

Three completely assembled pesticide respirators will be tested with a mechanical-testing apparatus as follows:

(a) Temperature in the test chamber will be approximately 25° C.

(b) Continuous airflow through the respirator will be 32 liters per minute for front-mounted, back-mounted, and chin-style gas mask pesticide respirators and chemical cartridge pesticide respirators, and not less than 115 (4 cubic feet) liters per minute to tight-fitting facepieces and 170 liters (6 cubic feet) per minute to loose-fitting hoods and helmets of powered air-purifying respirators.

(c) The test aerosol will contain 50-60 milligrams of 99+ percent free silica per cubic meter of air.

(d) The particle size distribution of the test suspension will have a geometric mean diameter of 0.4 to 0.6 micrometer, with a standard geometric deviation less than 2.

(e) Front-mounted, back-mounted, and chin-style gas mask pesticide respirators and chemical cartridge pesticide respirators will be tested for 90 minutes and powered air-purifying respirators will be tested for 4 hours.

§ 11.183-5 Lead fume test; minimum requirements.

Three completely assembled pesticide respirators will be tested with a mechanical-testing apparatus as follows:

(a) Continuous airflow through the respirator will be 32 liters per minute for front-mounted, back-mounted, and chin-style gas mask pesticide respirators and chemical cartridge pesticide respirators and not less than 115 liters (4 cubic feet) per minute, for powered air-purifying respirators with tight-fitting facepieces, and not less than 170 liters (6 cubic feet) per minute for powered air-purifying respirators with loose-fitting hoods and helmets.

(b) The test aerosol will contain 15-20 milligrams of freshly generated lead-oxide fume, calculated as lead, per cubic meter of air.

(c) The fume will be generated by impinging an oxygen-gas flame on molten lead.

(d) Front-mounted, back-mounted, and chin-style gas mask pesticide respirators and chemical cartridge pesticide respirators will be tested for 90 minutes and powered air-purifying pesticide respirators will be tested for 4 hours.

(e) The total amount of unretained test suspension, which is analyzed and calculated as lead, shall not exceed: (1) 0.43 milligram for any 90-minute test; (2) 4.8 milligrams for any 4-hour test made at 115 liters (4 cubic feet) per minute; or (3) 6.2 milligrams for any 4-hour test made at 170 liters (6 cubic feet) per minute.

§ 11.183-6 Dioctyl-phthalate test; minimum requirements.

(a) All canisters submitted for use with front-mounted and back-mounted gas mask pesticide respirators will be tested in an atmospheric concentration of 100 micrograms of dioctyl-phthalate per liter of air at continuous flow rates of 32 and 85 liters per minute for a test period of 5 to 10 seconds.

(b) The DOP leakage through the canister shall not exceed 0.03 percent of the ambient DOP concentration.

§ 11.183-7 Bench tests; minimum requirements.

(a) (1) Bench tests will be made on an apparatus that allows the test atmosphere at 50±5 percent relative humidity and at room temperature (25°±2.5° C.) to enter the canister or cartridge at predetermined concentrations and rates of flow, and that has a means for determining the test life of the canister or cartridge against carbon tetrachloride.

(2) Canisters and cartridges will be tested as they are used on each pesticide respirator, either singly or in pairs.

(3) Three canisters or cartridges or pairs of cartridges will be removed from containers and tested as received from the applicant.

(4) Two canisters, cartridges, or pairs of cartridges will be equilibrated at room temperature by passing 25 per-

cent relative humidity air through them at the following flow rates (expressed as liters per minute (l.p.m.)) for 6 hours:

Type of canister or cartridge	Airflow rate, l.p.m.
Air-purifying canister	64
Air-purifying cartridge	25
Powered air-purifying with tight-fitting facepiece	115
Powered air-purifying with loose-fitting hood or helmet	170

(5) Two canisters, cartridges, or pairs of cartridges will be equilibrated at room temperature by passing 85 percent relative humidity air through them at the flow rates stated in paragraph (a)(4) of this section for 6 hours.

(6) The equilibrated canisters or cartridges will be resealed, kept in an upright position at room temperature, and tested within 18 hours.

(b) Canisters and cartridges tested in accordance with the provisions of this section shall meet the requirements specified in Table 12.

TABLE 12—CARBON TETRACHLORIDE BENCH TESTS AND REQUIREMENTS FOR CANISTERS AND CARTRIDGES

[30 CFR Part 11, Subpart M, § 11.183-7]

Type of pesticide respirator	Test concentrations, p.p.m. CCl_4	Flow rate l.p.m.	Number of tests	Minimum life minutes [1]
Chest-mounted or back-mounted gas mask (as received)	20,000	64	3	
Chest mounted or back-mounted gas mask (equilibrated)	20,000	32	4	
Chin-style gas mask (as received)	5,000	64	3	
Chin-style gas mask (equilibrated)	5,000	32	4	
Chemical-cartridge respirator (as received)	1,000	64	3	
Chemical-cartridge respirator (equilibrated)	1,000	32	4	
Powered air-purifying respirator (tight-fitting facepiece, as received)	1,000	[2]115	3	
Powered air-purifying respirator (tight-fitting facepiece, equilibrated)	1,000	[2]115	4	
Powered air-purifying respirator (loose-fitting hood or helmet as received)	1,000	[3]170	3	
Powered air-purifying respirator (loose-fitting hood or helmet, equilibrated)	1,000	[3]170	4	

[1] Minimum life will be determined at 5 p.p.m. leakage.

[2] The flow rate shall be the effective flow rate of the device, but shall be not less than 115 l.p.m.

[3] The flow rate shall be the effective flow rate of the device, but shall be not less than 170 l.p.m.

Subpart N—Special Use Respirators

SOURCE: 39 FR 45013, Dec. 30, 1974, unless otherwise noted.

§ 11.200 Vinyl chloride respirators; description.

Vinyl chloride respirators, including all completely assembled respirators which are designed for use as respiratory protection during entry into and escape from vinyl chloride atmospheres containing adequate oxygen to support life, are described according to their construction as follows:

(a) Front-mounted or back-mounted gas masks;

(b) Chin-style gas masks;

(c) Chemical-cartridge respirators;

(d) Powered air-purifying respirators; and,

(e) Other devices, including combination respirators.

§ 11.201 Required components.

(a) Each vinyl chloride respirator described in § 11.200 shall, where its design requires, contain the following component parts:

(1) Facepiece;

(2) Canister with end-of-service-life indicator;

(3) Cartridge with end-of-service-life indicator;

(4) Harness;

(5) Attached blower; and,

(6) Breathing tube.

(b) The components of each vinyl chloride respirator shall meet the minimum construction requirements set forth in Subpart G of this part.

§ 11.202 Gas masks; requirements and tests.

(a) Except for the tests prescribed in 11.102-5, the minimum requirements and performance tests for gas masks, prescribed in Subpart I of this part, are applicable to vinyl chloride gas masks.

(b) The following bench tests are applicable to canisters designed for use with gas masks for entry into and escape from vinyl chloride atmospheres containing adequate oxygen to support life:

(1) Four canisters will be equilibrated at 25±5° C by passing 85±5 percent relative humidity air through them at 64 liters per minute for six hours.

(2) The equilibrated canisters will be resealed, kept in an upright position at room temperature, and tested according to paragraph (b)(3) of this section within 18 hours.

(3) The canisters equilibrated and stored as described in subparagraphs (1) and (2) of this paragraph will be tested on an apparatus that allows the test atmosphere at 85±5 percent relative humidity and 25±5° C to enter the canister continuously at a concentration of 25 ppm vinyl chloride monomer at a total flow rate of 64 liters per minute.

(4) The maximum allowable penetration after six hours of testing according to paragraph (b)(3) of this section shall not exceed 1 ppm vinyl chloride.

(c) Where canisters are submitted for testing and approval with a service life of more than four hours, the period of time for testing for vinyl chloride penetration will be performed at 150% of the service life specified in the manufacturer's application. Example: If a manufacturer requests approval of a respirator for six hours use against exposure to vinyl chloride, the maximum allowable penetration after nine hours of testing shall not exceed 1 ppm vinyl chloride.

§ 11.203 Chemical-cartridge respirators; requirements and tests.

(a) Except for the tests prescribed in §§ 11.162-4 through 11.162-8, the minimum requirements and performance tests for chemical-cartridge respirators prescribed in Subpart L of this part are applicable to replaceable-cartridge and single-use vinyl chloride chemical-cartridge respirators.

(b) The following bench tests are applicable to cartridges designed for use with chemical-cartridge respirators for entry into and escape from vinyl chloride atmospheres containing adequate oxygen to support life:

(1) Where two cartridges are used in parallel on a chemical-cartridge respirator, the bench test requirements will apply to the combination rather than the individual cartridges.

(2) Four cartridges or pairs of cartridges will be equilibrated at 25±5° C by passing 85±5 percent relative humidity air through them at 25 liters per minute for six hours.

(3) The equilibrated cartridges will be resealed, kept in an upright position, at room temperature, and tested according to paragraphs (b)(4) and (b)(5) for other than single-use respirators or according to paragraphs (b)(6) and (b)(7) for single-use respirators within 18 hours.

(4) The cartridges or pairs of cartridges for other than single-use respirators, equilibrated and stored as described in paragraphs (b)(1), (b)(2), and (b)(3) of this section, will be tested on an apparatus that allows the test atmosphere at 85±5 percent relative humidity and 25±5° C, to enter the cartridges or pairs of cartridges continuously at a concentration of 10 ppm vinyl chloride monomer at a total flowrate of 64 liters per minute.

(5) The maximum allowable penetration after 90 minutes testing of cartridges or pairs of cartridges for other than single-use respirators, according to paragraph (b)(4) of this section shall not exceed 1 ppm vinyl chloride.

(6) The single-use respirators, equilibrated and stored as described in paragraphs (b)(2) and (b)(3) of this section, will be tested on an apparatus that allows a test atmosphere at 85±5 percent relative humidity and 25°±5° C to be cycled through the respirator by a breathing machine at a concentration of 10 ppm vinyl chloride monomer at the rate of 24 respirations per minute at a minute volume of 40±0.6 liters. Air exhaled through the respirator will be 35±2° C with 94±3 percent relative humidity.

(7) The maximum allowable penetration after 144 minutes testing of respirators, according to paragraph (b) (6) of this section, shall not exceed 1 ppm vinyl chloride.

[39 FR 45013, Dec. 30, 1974, as amended at 42 FR 65168, Dec. 30, 1977]

§ 11.204 Powered air-purifying respirators; requirements and tests.

(a) Except for the tests prescribed in § 11.162-8, the minimum requirements and performance tests for powered air-purifying respirators prescribed in Subpart L of this part are applicable to vinyl chloride powered air-purifying respirators.

(b) The following bench tests are applicable to cartridges designed for use with powered air-purifying respirators for entry into and escape from vinyl chloride atmospheres containing adequate oxygen to support life.

(1) Four cartridges will be equilibrated at 25±5° C by passing 85±5 percent relative humidity air through them at 115 liters per minute for tight-fitting facepieces and 170 liters per minute for loose-fitting hoods and helmets, for six hours.

(2) The equilibrated cartridges will be resealed, kept in an upright position at room temperature and tested according to paragraph (b) (3) of this section within 18 hours.

(3) The cartridges equilibrated and stored as described in paragraphs (b) (1) and (2) of this section will be tested on an apparatus that allows the test atmosphere at 85±5 percent relative humidity and 25±5° C to enter the cartridge continuously at a concentration of 25 ppm vinyl chloride monomer at a total flow rate of 115 liters per minute for tight-fitting facepieces and 170 liters per minute for loose-fitting hoods and helmets.

(4) The maximum allowable penetration after six hours of testing according to paragraph (b) (3) of this section shall not exceed 1 ppm vinyl chloride.

§ 11.205 Requirements for end-of-service-life indicator.

(a) After June 30, 1975, each canister or cartridge submitted for testing and approval in accordance with §§ 11.202, and 11.203, and 11.204 shall be equipped with a canister or cartridge end-of-service-life indicator which shows a satisfactory indicator change or other obvious warning before 1 ppm vinyl chloride penetration occurs. The indicator shall show such change or afford such warning at 80±10 percent of the total service life to 1 ppm leakage, as determined by continuing each test described in paragraphs (b) of each of §§ 11.202, 11.203, and 11.204 until a 1 ppm leakage of vinyl chloride occurs. After September 30, 1976, a cartridge or canister without an end-of-service-life indicator will not be considered approved for use by employees exposed to vinyl chloride.

(b) The applicant shall provide sufficient pretest data to verify the performance of the end-of-service-life indicator required in paragraph (a) of this section.

[37 FR 6244, Mar. 25, 1972, as amended at 41 FR 13919, Apr. 1, 1976]

§ 11.206 Quality control requirements.

(a) In addition to the construction and performance requirements specified in §§ 11.201, 11.202, 11.203, 11.204, and 11.205, the quality control requirements in paragraphs (b), (c), and (d) of this section apply to approval of gas masks, chemical cartridge respirators, and powered air-purifying respirators for entry into and escape from vinyl chloride atmospheres containing adequate oxygen to support life.

(b) The respirators submitted for approval as described in paragraph (a) of this section shall be accompanied by a complete quality control plan meeting the requirements of Subpart E of this part.

(c) The applicant shall specify in the plan that a sufficient number of samples will be drawn from each bulk container of sorbent material and that where activated carbon is used, the following specific tests will be performed:

(1) Apparent density,

(2) Iodine number,

(3) Moisture content,

(4) Carbon tetrachloride number, and,

(5) Mesh size.

Such tests shall be performed in a quantity necessary to assure continued satisfactory conformance of the canisters and cartridges to the requirements of this subpart.

(d) Final performance quality control tests on the complete canisters and cartridges shall be accomplished using the bench tests and procedures prescribed in §§ 11.202, 11.203, 11.204, and 11.205.

§ 11.207 Labeling requirements.

(a) A warning shall be placed on the label of each gas mask, chemical-cartridge respirator, and powered air-purifying respirator, and on the label of each canister and cartridge, alerting the wearer to the need for a fitting test in accordance with the manufacturer's facepiece fitting instructions, providing service life information, providing specific instructions for disposal, and advising that the wearer may communicate to NIOSH any difficulties that may be experienced in the design and performance of any gas mask, chemical-cartridge respirator, or powered air-purifying respirator approved under the requirements of this subpart. The service lives of respirators meeting the test requirements of this subpart shall be specified as follows:

Chemical-cartridge respirator	1 hour
Gas mask	4 hours
Powered air-purifying respirator	4 hours

(b) Where the service life of a respirator is approved for more than four hours, the service life for which the respirator has been approved will be specified.

§ 11.208 Fees.

The following fees shall be charged for the examination, inspection, and testing of complete assemblies and components of respirators described in §§ 11.200 and 11.201.

Complete gas mask	$1,100
Complete chemical-cartridge respirator	1,150
Complete powered air-purifying respirator	1,500
Canister or cartridge only	750

SUBCHAPTER C—EXPLOSIVES AND RELATED ARTICLES; TESTS FOR PERMISSIBILITY AND SUITABILITY

PART 15—EXPLOSIVES AND RELATED ARTICLES

Sec.

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AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended: 30 U.S.C. 3, 5, 7; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961, 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: 35 FR 5335, Mar. 31, 1970, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12313, Mar. 24, 1978.

§ 15.1 Purpose.

The regulations in this part state the requirements for certification of explosives as permissible for use in underground coal mines; provides standards for the examination of explosives previously certified to check conformance to their basic specifications; and provide for miscellaneous tests not leading to certification.

§ 15.2 Definitions.

As used in this part, the following terms are defined:

(a) "Explosive" means any chemical compound, mixture or device, the primary or common purpose of which is to function by explosion, i.e., with substantially instantaneous release of gas and heat. This definition does not include blasting devices as defined in Part 17 of this subchapter.

(b) "Certificate of approval" means a formal document issued by MSHA stating that an explosive has met the specifications and requirements in this part, and authorizing the use of markings signifying this fact, as provided hereafter.

(c) "Applicant" means an individual, partnership, company, corporation, association, or other organization that compounds, manufactures, or controls the production of an explosive and that seeks a certificate of approval for permissibility.

(d) "Basic specifications" for an explosive that is submitted for certification means those chemical and physical properties which characterize it. They will be stated in the certificate of approval.

(e) "Poisonous gases" shall mean those gases, such as carbon monoxide, hydrogen sulfide, and oxides of nitrogen, which may have deleterious physiological effects even when present in the atmosphere in relatively low concentrations.

(f) "Ingredients" are substances specified or found to be present in any given sample of an explosive.

(g) "Test detonator" is a detonator containing a base charge of 0.25±0.02 gram of pentaerythritol tetranitrate (PETN).

(h) "Bureau" means the United States Department of the Interior, Bureau of Mines.

(i) "MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to March 9, 1978.

(j) "MSHA" means the U.S. Department of Labor, Mine Safety and Health Administration.

[35 FR 5335, Mar. 31, 1970, as amended at 39 FR 23998, June 28, 1974; 43 FR 12313, Mar. 24, 1978]

§ 15.3 Application for tests.

Before an applicant may obtain any tests by MSHA on an explosive, the applicant must file a written request, in duplicate (no application form is provided by MSHA), with a statement as to the nature of the explosive to be tested, including the composition. This request should be addressed to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. MSHA will review the application to determine whether the request is within the scope of this part. If the application is approved, an application number will be assigned and instructions given regarding the fees required and method of shipment of materials. Upon receipt of this information, the applicant shall transmit to the address given in this section a check, bank draft, or money order made payable to MSHA, to cover all fees for the tests requested.

[35 FR 5335, Mar. 31, 1970, as amended at 43 FR 12313, Mar. 24, 1978]

§ 15.4 Fees.

(a) The fee for complete tests leading to approval of an explosive as permissible is $1,320. If the applicant withdraws an explosive, or if the explosive fails to pass any of the tests prescribed in this part, MSHA will charge for the tests actually performed, with a minimum charge of $100 according to the charges stated in paragraph (b) of this section. The balance of the fees will be returned to the applicant.

(b) The fees covering individual and complete (total) tests are revised to read as follows:

	Individual test	Total
1. Complete permissibility test		$1,320
(i) Friction	$22	22
(ii) Physical examination	22	77
(iii) Chemical analysis	110	110
(iv) Gap	22	22
(v) Ballistic mortar	44	44
(vi) Gallery test 4	33	330
(vii) Gallery test 7	550	550
(viii) Rate of detonation	55	55
(ix) Gaseous products	110	110
(x) For other tests or additional work, the costs as determined by MSHA based on an estimate of the actual cost of the test. The Bureau will notify the applicant accordingly, and the fee shall be paid before such tests are begun.		

(c) If no experimental tests are required, the fee for issuance of a revised certificate of approval will be $25.

§ 15.5 Shipment, quantities, and sizes of explosives.

Samples of explosives to be tested shall be shipped only after MSHA has furnished instructions regarding the quantities of materials required, mode of shipment of the materials, and destination. Shipments shall be properly labeled and shall comply with the Interstate Commerce Commission regulations. The minimum quantities and sizes required for complete official tests are as follows:

(a) One hundred pounds of each explosive in 1¼ by 8-inch cartridges, but if the cartridge count per 50-pound case is less than 150 cartridges, then 300 cartridges is the minimum quantity required.

(b) Fifty cartridges of 8-inch length of each explosive in the smallest diameter (not less than 1 inch) in which it is desired the explosive shall be certified as permissible, except when this smallest diameter is 1¼ inches.

(c) Ten cartridges of 8-inch length of each explosive in any diameter other than those described in paragraphs (a) and (b) of this section, for which application is made to determine the permissibility of the explosive.

(d) Should the applicant later desire to market cartridges of other diameters, MSHA will, upon application, establish the basic specifications for grams of wrapper and apparent specific gravity of these diameters. A fee (§ 15.4(b) (2)) will be charged for each cartridge diameter. If the cartridge diameter is smaller than the smallest diameter previously approved as permissible, a propagation test (rate of detonation) will also be required and a fee charged for such test (§ 15.4(b) (8)). No test will be made on cartridges of a diameter smaller than ones along which detonation has failed to propagate, nor will a retest be made on same-diameter cartridges of a formulation for which detonation has failed to propagate in any one trial.

§ 15.6 Conditions under which tests leading to issuance of a certificate of approval will be made.

(a) The explosive will be stored in a MSHA magazine for at least 30 days before the gallery tests are made.

(b) Explosives containing incompatibles (that is substances that will react when mixed); or those containing either chlorites, chlorates, or perchlorates; or other explosives that are chemically unstable; or show leakage of explosive oil, or are in such condition that exudation of the explosive oil would occur in handling or transporting, will not be tested.

(c) Tests will be limited to samples of explosives which are produced under the control of the applicant.

(d) Explosives with cartridge diameters of less than 1 inch will not be tested for certification.

(e) No report on the results of tests made by MSHA, or any part thereof, may be published without prior written consent of MSHA.

§ 15.7 Place of investigation.

Tests on explosives will be made at the Bureau's facilities at Bruceton, Pa., in order of receipt of the explosives, provided an application is on file.

§ 15.8 Consultation.

Any potential applicant (or accredited representative thereof) may visit Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, to discuss, without charge, explosives proposed to be submitted for investigation by MSHA. Should preliminary tests be desirable before submitting the explosive for formal investigation, MSHA may conduct such tests for the applicant after payment of the fees prescribed in § 15.4. The results from such preliminary tests may not be used to reduce the requirements of the formal investigation.

[35 FR 5335, Mar. 31, 1970, as amended at 43 FR 12313, Mar. 24, 1978]

§ 15.9 Observers at formal investigations and demonstrations.

No one shall be present during any part of the formal investigation for permissibility conducted by MSHA except the necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon by the applicant and by MSHA. After the issuance of a certificate of approval, MSHA may conduct such public demonstrations and tests of the approved explosive as it sees fit. Those who attend any part of the investigation, or any public demonstration, shall be present solely as observers; the conduct of the investigation and of any public demonstration shall be controlled by MSHA. Results of chemical analysis for ingredients and all information contained in the drawings, specifications, and instructions shall be deemed proprietary and their disclosure will be appropriately safeguarded by MSHA.

[39 FR 23998, June 28, 1974]

§ 15.10 Chemical and physical tests.

(a) *Chemical tests.* The following chemical tests will be made:

(1) Chemical analysis for ingredients.

(2) Gaseous products of detonation will be determined using the Bichel gage for carbon monoxide and Crawshaw-Jones method for oxides of nitrogen.

(b) *Physical tests.* The following physical tests will be made:

(1) *Physical examination.* The physical examination of an explosive is made on several cartridges of each size taken at random from the shipment of explosives. It shall consist of determination of apparent specific gravity and wrapper-to-explosive ratio.

(2) *Ballistic mortar test.* The strength of an explosive will be determined by the ballistic mortar.

(3) *Gallery test 4.* Ten trials, each with a 1½-pound tamped charge of explosive, are made. Each charge is fired, without stemming, into a mixture of natural gas and air containing 4.0±0.2 percent of Pittsburgh natural gas (Bruceton property), or its equivalent, and 8 pounds of bituminous coal dust placed on shelves in the gallery, at 25°±5° C.

(4) *Gallery test 7.* The W_{50} (weight for 50 percent probability of ignition) will be determined using the Bruceton up-and-down method and firing a minimum of 20 tamped charges of varying weights, stemmed with one pound of dry-milled plastic fireclay, from a steel cannon into a mixture of natural gas and air containing 8.0±0.3 percent of Pittsburgh natural gas, at a temperature of 25°±5° C.

(5) *Rate of detonation.* The rate of detonation is determined on a 50-inch column of 1¼-inch diameter cartridges and for the smallest diameter submitted for testing, provided that this diameter is less than 1¼ inches. Nongelatinous explosives are initiated with the Bureau's test detonator only, while gelatinous explosives are initiated with the Bureau's test detonator and a 60-gram tetryl-pellet booster.

(6) *Pendulum friction test.* Ten trials are made with the steel shoe released from a height of 1.5 meters (59 in.) and if evidence of sensitivity is obtained, the test is repeated with the hard-fiber-faced shoe.

(7) *Explosion-by-influence test.* The air-gap sensitivity is determined by the halved-cartridge method on 1¼-inch diameter cartridges.

§ 15.11 Establishment of basic specifications.

The composition of the explosive as furnished by the applicant, will form a part of the basic specifications provided that the requirements of §§ 15.12(a) and 15.21(b) are met. Such physical properties of the explosive as may be furnished by the applicant will form a part of the basic specifications, provided that the requirements of § 15.21 are met with the exception of the air-gap sensitivity, in which case the requirement of § 15.12(c) must be met; otherwise the basic specifications will be those obtained by MSHA tests.

§ 15.12 Requirements for approval as a permissible explosive.

(a) The chemical composition as determined by MSHA's analysis must correspond, within tolerances specified in § 15.21(b), to the composition as furnished by the applicant.

(b) The explosive must not fail to propagate completely in any of the tests involving detonation, except as provided in paragraph (g) of this section.

(c) In the explosion-by-influence test, the air-gap sensitivity of the explosive in 1¼-inch diameter cartridges must be at least 3 inches.

(d) The explosive must yield in gallery test 7, a W_{50}value equal to or greater than 450 grams to 95 percent confidence.

(e) The explosive must pass without a single ignition, gallery test 4.

(f) The volume of poisonous gases produced by the explosive must not exceed 2.5 cubic feet per pound of explosive (71 liters per 454 grams).

(g) If an explosive fails to propagate completely in the rate of detonation test (§ 15.10(b)(5)), it will not be approved for cartridges having a diameter equal to or smaller than that of the cartridge that failed the test.

(h) In the pendulum friction test, an explosive must not show, in any trial with the hard fiber-faced shoe, a result more unfavorable than an almost indistinguishable local crackling.

§ 15.13 Notification to applicant.

After MSHA has completed the investigation of an explosive, a written report summarizing the results of the investigation and including a statement of either approval or disapproval of the explosive as permissible will be sent to the applicant.

§ 15.14 Approved markings.

(a) Upon certification of an explosive as permissible, it shall be marketed only under a brand or trade name which shall have been furnished to MSHA, and the certification shall apply only to the explosive as so designated.

(b) The wrapper of each cartridge must be clearly and legibly labeled:

(Insert brand or trade name of explosive) Permissible Explosive, Approved by the U.S. Department of Labor, MSHA. A reasonable abbreviation of "by the U.S. Department of the Interior, MSHA" is acceptable.

(c) The brand or trade name and the words "Permissible Explosive" must be included in the case marking.

(d) The applicant must warn the user by means of a case-insert that the explosive is permissible only when used in conformance with MSHA's requirements (§ 15.19).

(e) After obtaining certification, the applicant who places approved markings on his permissible explosives must use all reasonable precautions to assure that his explosives are manufactured to conform with the basic specifications within specified tolerances.

[35 FR 5335, Mar. 31, 1970, as amended at 43 FR 12313, Mar. 24, 1978]

§ 15.15 Changes after certification.

No change in the basic specifications may be made by the applicant without prior written approval from MSHA. To obtain this approval, application shall be made in writing giving complete information on the nature of the proposed change(s). MSHA will determine what tests, if any, will be required. A fee will be charged for such tests. Once a change in basic specifications involving composition has been approved, the brand name may only be used for the new composition, and the former composition may not be manufactured as a permissible explosive until it has been reapproved under the provisions of this part.

§ 15.16 Withdrawal of certification.

MSHA reserves the right to rescind for cause, at any time, any certification granted under this part. Upon such withdrawal, the certification shall lose all force and effect, and explosives to which it relates shall not be marketed as permissible.

§ 15.17 Release of test data.

MSHA may publish test results in such manner as will not identify the data, except cartridge weight, count, and detonation velocity, of an individual applicant.

§ 15.18 Lists of permissible explosives.

(a) *Active list.* MSHA will maintain a list of active permissible explosives which will be published from time to time so that interested parties may have information regarding available explosives which have passed the tests leading to approval. In order to be retained on the active list, any explosive must be produced in a total quantity of not less than 50,000 pounds in any period of 3 calendar years. This requirement shall become effective on January 1 following the publication of these regulations in the FEDERAL REGISTER. The applicant will be notified of MSHA's intent to remove any brand from the active list. An applicant may request that a permissible explosive be placed on the inactive list, or be deleted entirely.

(b) *Inactive list.* MSHA will maintain an unpublished file of inactive permissible explosives. These explosives will be retained on the inactive list for a period not to exceed 5 years and will be returned to the active list during this period only after approval by MSHA on specific written request of the applicant. An explosive may be deleted from the inactive list upon written request of the applicant. An explosive may not be manufactured for sale as a permissible explosive while on the inactive list.

§ 15.19 Use of permissible explosives.

An explosive certified as permissible under this part is permissible in use only so long as it meets the following requirements:

(a) Conforms with the basic specifications within limits of tolerances prescribed herein, and the cartridges are of diameters that have been approved.

(b) Is stored in surface magazines under conditions that tend to maintain original product character, and is used within 48 hours after being taken underground.

(c) Remains in its original cartridge wrapper throughout storage and use, without admixture with other substances.

(d) Is initiated with a copper or copper-based-alloy shell, commercial electric detonator (not cap and fuse) of not less than No. 6 strength.

(e) Is in all other respects used in conformance with the regulations specified in the most recent edition of the applicable Federal Mine Safety Code.

§ 15.20 Field testing.

MSHA will periodically collect and examine samples of permissible explosives in order to determine whether they continue to conform to the basic specifications.

§ 15.21 Tolerances and requirements as applied to field samples.

Tolerances which provide for reasonable limits of variation in the results of analyses and tests of field samples of permissible explosives were established July 1, 1915, subsequently amended November 15, 1920, February 26, 1921, ana March 24, 1955, and are further modified in this section. The tolerances and requirements as enumerated below supersede all previous tolerances.

(a) Requirements for tests that directly affect permissibility.

(1) *Gallery test 7.* The sample must yield in gallery test 7, as a W_{50} value equal to or greater than 450 grams to 95 percent confidence. (For exception see § 15.22(a)).

(2) *Gallery test 1.* Field samples failing Gallery test 7 but excepted under § 15.22(a) will be subjected to Gallery test 1. In this test, 10 trials, each with a 220-gram tamped charge of the explosive, are made. Each charge, stemmed with 1 pound of dry-milled plastic fire-clay, is fired from a steel cannon into a mixture of natural gas and air containing 8.0±0.3 percent of Pittsburgh natural gas, at a temperature of 25°±5° C. No ignitions must result.

(3) *Gallery test 4.* The sample must pass five shots with a tamped unstemmed charge of 680 grams (1½ pounds).

(4) *Pendulum friction test.* The sample must pass the pendulum friction test with a hard-fiber-faced shoe released from a height of 1.5 meters (59 inches).

(5) *Poisonous gases.* Poisonous gases produced must not exceed 2.5 cu. ft. per pound of the explosive (71 liters per 454 grams).

(6) *Propagation test.* Complete propagation of the explosive must be obtained in the rate of detonation test.

(b) Requirements for tests that do not directly affect permissibility.

(1) *Carbonaceous combustible material.* The tolerance shall be ±3 percent of the total explosive.

(2) *Moisture and other ingredients.* The tolerances shall be in accordance with those shown in Table 1.

TABLE 1—LIMIT OF VARIATION (PERCENTAGE OF TOTAL EXPLOSIVE) FOR VARIOUS QUANTITIES OF INGREDIENT

Quantity of ingredient (in percent)		Limit of variation Pct.(±)
From—	To—	
0.0	5.0	1.2
5.1	10.0	1.5
10.1	20.0	1.7
20.1	30.0	2.0
30.1	40.0	2.3
40.1	50.0	2.5
50.1	55.0	2.8
55.1	100.0	3.0

(3) *Rate of detonation.* The tolerance shall be ±15 percent of that shown in the basic specifications.

(4) *Ballistic mortar.* The tolerance shall be ±10 percent of that shown in the basic specifications.

(5) *Explosion by influence test.* The air-gap sensitivity, using 1¼-inch-diameter cartridges, must be not less than 2 inches.

(6) *Grams of wrapper.* The tolerance shall be ±2 grams per 100 grams of explosives ingredient based on that shown in the basic specifications.

(7) *Apparent specific gravity.* The tolerance shall be ±7.5 percent of that shown in the basic specifications.

§ 15.22 Field sample failures.

(a) Any field sample will be declared nonpermissible if when tested it fails to meet any of the requirements of

§ 15.21(a): *Provided, however,* That, for a period of 5 years following the issuance of this schedule, the requirement of § 15.21(a)(1) shall not apply to any field sample whose basic specifications were approved under prior schedules.

(b) MSHA will immediately report any field sample failure to the applicant. The applicant must immediately remove from the market and the field any unused portions of the explosive bearing the same lot number as the sample tested. If a field sample of any particular brand of permissible explosive fails three times within a period of 5 years, the explosive will be declared nonpermissible and removed from the lists of permissible explosives.

§ 15.23 Variances from prescribed tolerances.

Variances on field sample tests from tolerances as specified in § 15.21(b) do not directly affect permissibility of the explosive, but the applicant will be notified of such variances, and is then obligated to modify his formulation of future lots of the explosive to bring the explosive within the prescribed limits and to keep it within such limits.

§ 15.24 Miscellaneous tests on explosives and other hazardous materials.

(a) MSHA conducts some tests not leading directly to approval of explosives as permissible for use in underground coal mines. Fees for these tests will be prescribed in § 15.4 and as prescribed below:

(1) Impact test	$33
(2) Electrostatic spark test	22
(3) Thermal sensitivity test	33
(4) Suspended tests in the gallery (per shot)	11
(5) Gaseous products:	
i Oxides of nitrogen only	77
ii Complete analysis of gaseous products, including oxides of nitrogen	110

(b) Application for miscellaneous tests shall follow the procedure prescribed in § 15.3 Applicants requesting tests shall follow the instructions under § 15.5. The applicant will be notified by MSHA as to the quantity of material needed. No report on the results of tests made by MSHA, or any part thereof, may be published without prior written consent of MSHA.

Section 15.19 of Part 15 deals with the use of permissible explosives, and paragraph (e) of that section incorporates the "regulations specified in the most recent edition of the applicable Federal Mine Safety Code." Except for provisions which impose requirements now expressly dealt with in, or which are inconsistent with, the Federal Coal Mine Health and Safety Act of 1969, these regulations are as follows:

BITUMINOUS COAL AND LIGNITE UNDERGROUND MINES

ARTICLE IV—EXPLOSIVES AND BLASTING

* * * * *

SEC. 5. *Blasting practices.* * * *

b * * *

3. Where the coal is cut, shots shall not be fired if the blast hole is drilled beyond the limits of the cut.

4. Boreholes shall be cleaned, and they shall be checked to see that they are placed properly and are of correct depth, in relation to the cut, before being charged.

5. All blasting charges in coal shall have a burden of at least 18 inches in all directions if the height of the coal permits.

6. Boreholes shall be stemmed with at least 24 inches of incombustible material, or at least one-half of the length of the hole shall be stemmed if the hole is less than 4 feet in depth unless other permissible stemming devices or methods are used.

* * * * *

9. Charges exceeding 1½ pounds but not exceeding 3 pounds, shall be used only if boreholes are 6 feet or more in depth, the explosives are charged in a continuous train, with no cartridges deliberately deformed or crushed, with all cartridges in contact with each other and with the end cartridge touching the back of the hole and the stemming respectively, and Class A or Class B permissible explosives are used; provided, however, that the 3-pound limit does not apply to solid rock work.

10. Shots shall be fired by certified shot firers wherever State law requires such certification. In mines where certification of shot firers is not required by State law, the management shall designate competent persons to fire shots.

11. Boreholes shall not be charged while any other work is being done at the face, and the shot or shots shall be fired before any other work is done in the zone of danger from blasting except that which is necessary to safeguard the employees.

12. Only nonmetallic tamping bars shall be used for charging and tamping boreholes. This does not prohibit the use of a nonmetallic tamping bar with a nonsparking metallic scraper on one end.

13. The leg wires of electric detonators shall be kept shunted until ready to connect to the firing cable.

14. Shots shall not be fired from the power or signal circuit while any men are in the mine.

15. The roof and ribs of working places shall be tested before and after firing each shot or group of multiple shots.

16. Ample warning shall be given before shots are fired, and care shall be taken to ascertain that all persons are in the clear. Men shall be removed from adjoining working places when there is danger of a shot blowing through.

17. Mixed types or brands of explosives shall not be charged or fired in any borehole.

* * * * *

SEC. 6. *Blasting cables.* a. Blasting cables shall be:

1. Well insulated and as long as may be necessary to permit the shot firer to get in a safe place around a corner.

2. Short-circuited at the battery end until ready to attach to the blasting unit.

3. Staggered as to length or the ends kept well separated when attached to the detonator leg wires.

4. Kept clear of power wires and all other possible sources of active or stray electric current.

SEC. 7. *Misfires.* a. Where misfires occur with electric detonators, a waiting period of at least 5 minutes shall elapse before anyone returns to the shot. After such failure, the blasting cable shall be disconnected from the source of power and the battery ends short-circuited before electric connections are examined.

b. Explosives shall be removed by firing a separate charge at least 2 feet away from, and parallel to, the misfired charge or by washing the stemming and the charge from the borehole with water, or by inserting and firing a new primer after the stemming has been washed out.

c. A very careful search of the working place, and, if necessary, of the coal after it reaches the tipple shall be made after blasting a misfired hole, to recover any undetonated explosive.

d. The handling of a misfired shot shall be under the direct supervision of the mine foreman or a competent person designated by him.

ANTHRACITE UNDERGROUND MINES

ARTICLE IV—EXPLOSIVES AND BLASTING

* * * * *

SEC. 4. *Blasting practices.* * * *

b. * * *

2. Boreholes shall be cleaned, and they shall be checked by the miner in charge to see that they are placed properly before being charged.

3. Boreholes shall be stemmed with at least 24 inches of material, or at least one-half of the length of the hole shall be stemmed if the hole is less than 4 feet in depth or suitable blasting plugs shall be used.

* * * * *

6. Shots shall be fired by certified persons in charge.

7. Boreholes shall not be charged while any other work is being done at the face, and the shot or shots shall be fired before any other work is done in the zone of danger from blasting except that which is necessary to safeguard the employees.

8. Only nonmetallic tamping bars shall be used for charging and tamping boreholes.

9. The leg wires of electric detonators shall be kept shunted until ready to connect to the firing cable.

10. Shots shall not be fired from any power or signal circuit while any men are in the section of the mine in which such shots are fired.

11. The roof and faces of working places shall be tested before and, where possible, after firing each shot or group of multiple shots.

12. Ample warning shall be given before shots are fired, and care shall be taken to ascertain that all persons are in the clear. Men shall be removed from adjoining working places when there is danger of a shot blowing through.

13. Mixed types of explosives shall not be charged or fired in any borehole, nor shall detonators made by different manufacturers be combined in the same blasting circuit.

* * * * *

15. Workmen shall never go inside a battery to start the flow of material.

16. Power wires and cables that could contact blasting cables or leg wires shall be deenergized during charging and firing.

SEC. 5. *Blasting cables.* a. Blasting cables shall be:

1. Well insulated and as long as may be necessary to permit the person firing the blast to get in a safe place.

2. Short-circuited at the battery end until ready to attach to the blasting unit.

3. Staggered as to length or the ends kept well separated when attached to the detonator leg wires.

4. Kept clear of power wires and all other possible sources of active or stray electric currents.

SEC. 6. *Misfires.* a. Where misfires occur with electric detonators, a waiting period of at least 30 minutes shall elapse before anyone returns to the shot. After such failure, the blasting cable shall be disconnected from the source of power and the battery ends short-circuited before electric connections are examined.

b. Explosives shall be removed by firing a separate charge at least 2 feet away from, and parallel to, the misfired charge.

c. A very careful search of the working place, and, if necessary, of the coal after it reaches the tipple, shall be made after blasting a misfired hole to recover any undetonated explosive.

d. The handling of a misfired shot shall be under the direct supervision of the miner in charge.

PART 16—STEMMING DEVICES

Sec.
16.1 Purpose.
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16.17 Field sampling.
16.18 Rescission of approval.

AUTHORITY: Secs. 3, 5, 36 Stat. 370, as amended, sec. 212, 66 Stat. 709; 30 U.S.C. 5, 7, 482; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: 35 FR 5341, Mar. 31, 1970, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12313, Mar. 24, 1978.

§ 16.1 Purpose.

The regulations in this part specify the safety standards and the requirements for approval by MSHA, of stemming devices as permissible for use in coal mines. The use of stemming devices for confining permissible explosives when fired for underground blasting, involves consideration of several possible hazards including:

(a) Ignition of methane-air and/or coal dust-air mixtures when the explosive charge is detonated.

(b) Emission of toxic gases such as carbon monoxide, oxides of nitrogen, and hydrogen sulfide when the explosive charge is detonated.

(c) Other hazards associated with the firing of inadequately confined explosive charges.

§ 16.2 Definitions.

As used in this part, the following words are defined:

(a) "Stemming devices" means any flame resistant unit which has incorporated in its design positive means for providing adequate confinement to permissible explosives in boreholes when used as prescribed.

(b) "Approval" means written official notification by MSHA that upon investigation the stemming device has met satisfactorily the requirements of this part for use in coal mines.

(c) "Permissible" means conforming in every respect to the provisions of the appropriate MSHA test schedule.

(d) "Approval label" means an identifying mark indicating that the stemming device has been approved by MSHA as a permissible stemming device.

(e) "Flame resistant" means incapable of supporting combustion under the test conditions hereinafter stated.

(f) "MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to March 9, 1978.

(g) "MSHA" means the U.S. Department of Labor, Mine Safety and Health Administration.

[35 FR 5341, Mar. 31, 1970, as amended at 39 FR 23998, June 28, 1974; 43 FR 12313, Mar. 24, 1978]

§ 16.3 Application for tests.

Before MSHA will make any tests on a stemming device or on any change in the design thereof, the manufacturer or user must file a written request (no application form is provided by MSHA) with Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. A statement as to the nature of the stemming device to be tested, the composition, and any other pertinent information relative to the stemming device must accompany the application. MSHA will review the application and device whether or not the tests will be undertaken. If the application is approved, an application number will be assigned and instructions given regarding the fees required and method of shipment of materials. Upon receipt of this information, the applicant must transmit, to the address given in this section, a check, banknote, or money order, made payable to MSHA, to cover all fees for the tests; drawings and specifications of the stemming device must be transmitted at the same time.

[35 FR 5341, Mar. 31, 1970, as amended at 43 FR 12313, Mar. 24, 1978]

§ 16.4 Fees.

(a) Complete tests for approval	[1]$1,225
(b) Individual tests	
1 Chemical	65
2 Physical examination	25
3 Gallery, per shot	16
4 Rough handling	15
5 Flammability	40
6 Fee for tests not included in this list will be based on actual costs	
(c) Fee for tests required by changes in design will be determined by MSHA; minimum fee	$100

[1] Fees for additional tests, described in paragraph (c) of § 16.10, will be determined by MSHA and will be in addition to this fee. If the applicant withdraws the stemming device after testing has begun, or if the device fails to pass any of the required tests, MSHA will charge a minimum of $100 and will return to the applicant any part of the remaining fee not required to compensate MSHA for its services.

§ 16.5 Drawings and specifications.

A set of drawings, bill of material, and specifications sufficient in number and detail to identify fully the parts of the stemming device must be furnished to MSHA. Drawings should be numbered and dated to facilitate identification and reference in the records. The drawings and specifications for stemming devices shall include an assembly drawing, or drawings, clearly showing the over-all dimensions of the stemming device, tolerances, and the character, size, and relative arrangement of all parts. The nature of the materials used in the assembly shall be specified on the drawings.

§ 16.6 Shipment of stemming device samples.

Samples of the stemming device to be tested should be shipped to MESA only after MSHA has furnished shipping instructions specifying the quantities, sizes, and mode of shipment of the samples.

§ 16.7 Place of investigation.

Tests on stemming devices will be made at the Approval and Certification Center, in the order of receipt of applications.

[35 FR 5341, Mar. 31, 1970, as amended at 43 FR 12313, Mar. 24, 1978]

§ 16.8 Consultation.

Any potential applicant (or accredited representative thereof) may visit the Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Philadelphia, W. Va. 26059 to discuss, without charge, stemming devices proposed to be submitted for investigation by MSHA. Should preliminary tests appear advisable before submitting the stemming device for approval, MSHA may conduct such tests for the applicant with fees as prescribed in § 16.4.

[35 FR 5341, Mar. 31, 1970, as amended at 43 FR 12313, Mar. 24, 1978]

§ 16.9 Observers at formal investigations and demonstrations.

No one shall be present during any part of the formal investigation conducted by MSHA which leads to approval for permissibility except the necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon by the applicant and

MSHA. Upon granting approval for permissibility, MSHA will announce that such approval has been granted to the stemming device and may thereafter conduct, from time to time in its discretion, public demonstrations of the tests conducted on the approved stemming device. Those who attend any part of the investigation, or any public demonstration, shall be present solely as observers; the conduct of the investigation and of any public demonstration shall be controlled wholly by MSHA. Results of chemical analyses of material and all information contained in the drawings, specifications, and instructions shall be deemed confidential and their disclosure will be appropriately safeguarded by MSHA.

§ 16.10 Physical and chemical tests.

(a) *Compositional tests.* Such test will be made to verify the submitted specifications.

(b) *Physical tests.* The following physical tests will be made:

(1) *Physical examination.* An examination will be made to verify the submitted specifications, or to establish basic specifications on the composition, as are deemed necessary by MSHA.

(2) *Gallery test.* Fifty trials, using two or more different permissible explosives selected by MSHA, will be made with not more than 30 trials with any one permissible explosive, firing a 220-gram charge of the permissible explosive from a cannon stemmed with the stemming device under test, into a steel gallery charged with a mixture of natural gas and air containing 8.0 ±0.4 percent of the Pittsburgh natural gas, at a temperature of 25°±5° C. In order to pass this test there must not be an ignition in any of the trials made.

(3) *Rough-handling test.* A specially designed box is used for making the rough-handling test. This box is approximately 6 feet in height and it is equipped with seven baffles each approximately 10 inches apart and sloping 30° from the horizontal. Ten samples of the stemming device to be tested will be introduced individually at the top and allowed to drop from baffle to baffle. Each stemming device will be subjected to 30 passes through the box and then will be subjected to the gallery test prescribed in paragraph (b) (2) of this section. Each stemming device must pass the gallery test in the physical condition existing at the end of the rough-handling test. These 10 gallery trials shall be in addition to the 50 trials described in paragraph (b) (2) of this section.

(4) *Flammability test.* At least three specimens 2 inches in length, ¼-inch in width and ⅟₁₆-inch thick shall be cut or prepared from each major component of the device under test, excluding any wrapper material. If the total weight of any wrapper material exceeds 3 grams, it shall be tested separately. If the nature of the material to be tested precludes the preparation of specimens with the above dimensions, then the specimens shall have dimensions as near as possible to those specified. The specimen shall be clamped in a support at one end with its longitudinal axis horizontal and its transverse axis inclined at 45° to the horizontal. Under the test specimen, there shall be clamped a piece of 20-mesh Bunsen burner gauze about 1½ inches square, in a horizontal position ¼-inch below the specimen with about ½-inch of the specimen extending beyond one edge of the gauze. If the specimen is not rigid, it shall be allowed to bend and come to rest on the gauze. A Bunsen-type burner, with a flame 1 inch in height having a temperature of 950°±50°C. when measured by means of a 20 B & S gauge, iron-constantan thermocouple, centered in the flame at the tip of the inner cone, shall be placed under the free end of the test specimen and adjusted so that the flame tip is just in contact with the specimen. The flame shall be removed when ignition of the specimen is observed or after an application time of not more than 30 seconds. If the specimen does not continue to burn with visible flame after the first application of flame, a second application of the burner flame shall be made immediately under the same conditions for a period not to exceed 30 seconds. If none of the specimens continue to burn with a visible flame for more than 5 seconds after removing the burner flame in any of the individual trials made, the material shall be con-

sidered flame resistant and acceptable for use in the stemming device.

(c) *Additional tests.* Additional tests will be made if it is determined by MSHA that they are necessary to establish safety characteristics of the stemming device.

§ 16.11 Requirements for approval of a stemming device.

Approval will be given only for stemming devices which pass the tests prescribed in § 16.10. Approval will be based primarily on tests made on one standard size to be designated by MSHA (1¼-inch diameter unless otherwise specified). The applicant must, however, submit samples and specifications for all sizes for which approval is desired. No stemming device with diameter exceeding the length will be accepted for test. For sizes smaller than the standard size, the overall length must not be less than that for the standard size. For sizes having a diameter larger than the standard size, the ratio of the length to the diameter must not be less than that for the standard size. Specific approval must be obtained for each size before it can be labeled as approved. The amount of any combustible wrapper used must not exceed 3 grams.

§ 16.12 Change in design.

Any change in the design of an approved stemming device must first be approved by MSHA before such modified stemming devices are offered to the trade under the approval label.

§ 16.13 Granting of approval; notification of approval or disapproval.

After MSHA has completed the investigation of a stemming device, a written report covering approval or disapproval of the stemming device will be sent to the applicant. The report of approval will establish the tolerances that must be maintained in manufacture and all requirements for use as described in § 16.16.

§ 16.14 Approval label.

(a) Upon approval of the stemming device and before the stemming device is offered to the trade, the applicant must place an approval label on all containers of packages of such stemming devices which must be of the same characteristics as the stemming device approved by MSHA. The approval label which shall be submitted to and approved by MSHA shall bear the emblem of the Mine Safety and Health Administration, and be inscribed as follows:

PERMISSIBLE STEMMING DEVICE

Approval Number ——— issued to ———

(b) When required by MSHA, appropriate words of caution must be added.

(c) A manufacturer who places the approval label on the stemming device must use all reasonable precautions to manufacture the stemming device to conform with the specified tolerances of the stemming device as approved, and is obligated to warn the user that the stemming device is permissible only when employed as specified in § 16.16.

[35 FR 5341, Mar. 31, 1970, as amended at 43 FR 12313, Mar. 24, 1978]

§ 16.15 List of permissible stemming devices.

MSHA will maintain a list of permissible stemming devices which will be published from time to time.

§ 16.16 Conditions under which stemming devices are to be used.

An approved stemming device is permissible only when used under the following conditions:

(a) The stemming device must be completely within the borehole and in physical contact with the explosive charge before the shot is fired.

(b) The stemming device must be of such a size as to fill tightly the cross section of the borehole when it is properly put into place.

(c) The explosive being stemmed must be classed as "permissible" and it must be used in the manner prescribed by MSHA in Part 15 of this subchapter.

(d) Other conditions, which will be set down by MSHA as appropriate to the particular stemming device, must be observed.

§ 16.17 Field sampling.

MSHA will, from time to time, collect and reexamine permissible stemming devices in order to determine whether they conform to the stemming device as approved. If the field sample fails to pass any of the tests described in § 16.10 or exceeds the established tolerances, the manufacturer will be so notified and required to take such steps as are necessary to make all future production conform to the approved specifications. In the event of failures of a nature deemed by MSHA to present definite hazard in use of the stemming device, MSHA may request that the manufacturer remove from the market and the field any unused stemming devices of similar faulty nature.

§ 16.18 Recission of approval.

MSHA reserves the right to rescind for cause at any time, any approval granted under this part. Upon such rescission the stemming device will be declared nonpermissible and will be removed from the list of permissible stemming devices.

PART 17—BLASTING DEVICES

Sec.
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17.10 Chemical and physical tests.
17.11 Requirements for approval of permissible blasting devices.
17.12 Change in design.
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17.14 Release of test data.
17.15 List of permissible blasting devices.
17.16 Conditions under which a permissible blasting device is to be used.
17.17 Tolerances and requirements as applied to field samples.
17.18 Field sample failures.
17.19 Variances from prescribed tolerance.
17.20 Rescission of approval.

AUTHORITY: Secs. 3, 5, 36 Stat. 370, as amended, sec. 212, 66 Stat. 709; 30 U.S.C. 5, 7, 482; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: 35 FR 5339, Mar. 31, 1970, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12313, Mar. 24, 1978.

§ 17.1 Purpose.

The regulations in this part specify certain minimum safety standards and requirements for approval, by MSHA, of blasting devices as permissible for use in coal mines. The use of blasting devices for dislodging coal in underground mines involves at least two possible hazards, namely:

(a) Ignition of methane-air and/or coal dust-air mixtures when the blasting device is operated.

(b) Emission of toxic gases, such as carbon monoxide, oxides of nitrogen, and hydrogen sulfide, when the blasting device is operated.

§ 17.2 Definitions.

As used in this part, the following terms are defined:

(a) "Blasting device" is a unit used for breaking down coal involving a high-pressure discharge from a metal shell but does not include blasting devices whose operations depend upon pressures developed wholly by mechanical means.

(b) "Approval" is a written official notification by MSHA, that, upon investigation, the blasting device has met satisfactorily the requirements of this part for use in coal mines. Reports of tests other than the complete series required for the determination of permissibility are not approvals and should not be construed as such.

(c) "Permissible" means conforming, when completely assembled, in every respect with the blasting device approved by MSHA for use in coal mines.

(d) "Approved marking" is an identifying mark indicating that the blasting device has been approved by MSHA as a permissible blasting device.

(e) "MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to Mar. 9, 1978.

(f) "MSHA" means the U.S. Department of Labor, Mine Safety and Health Administration.

[35 FR 5339, Mar. 31, 1970, as amended at 39 FR 23999, June 28, 1974; 43 FR 12313, Mar. 24, 1978]

§ 17.3 Application for tests.

Before MSHA will make any tests leading to the approval of a blasting device or for a subsequent change in its design, the applicant must file a written request (no application form is provided by MSHA) with a statement as to the nature of the blasting device to be tested, the composition of the active components, and any other pertinent information relating to the blasting device. MSHA's engineers will review the application and decide whether or not the tests will be undertaken. The request for the making of tests must be addressed to Approval and Certification Center, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. Upon approval of the application, an application number will be assigned and instructions given regarding the fees required and method of shipment of materials. Upon receipt of this information the applicant should transmit to the address given in this section, a check, bank draft, or money order made payable to MSHA to cover all fees for the tests.

[35 FR 5339, Mar. 31, 1970, as amended at 43 FR 12313, Mar. 24, 1978]

§ 17.4 Fees.

(a) Complete tests for approval when electrical tests are not required	[1]$1,210
(b) Complete tests for approval when electrical tests are required	[1]1,450
(c) Individual tests	
1 Chemical	120
2 Physical examination	60
3 Gallery, per shot	15
4 Pendulum friction, per sample	30
5 Gaseous products, per sample	120
6 Shell temperature	100
7 Electrical	240
8 Fee for tests not included in this list will be based on actual costs	
(d) Fee for tests required by changes in design will be determined by MSHA; minimum fee	500

[1] If the applicant withdraws the blasting device after testing has begun, or if the device fails to pass any of the required tests, MSHA will charge a minimum of $500 and will return to the applicant any part of the remaining fee not required to compensate MSHA for its services.

§ 17.5 Drawings and specifications.

A set of drawings, bill of materials, and specifications sufficient in number and detail to identify fully the parts of the blasting device must accompany the application. Drawings shall be numbered and dated to facilitate identification and reference in the records. The drawings and specifications for blasting devices shall include an assembly drawing or drawings, clearly showing the overall dimensions of the blasting device, tolerances, and character, size, and relative arrangement for all parts. The nature of the materials used in the assembly shall be specified on the drawings.

§ 17.6 Shipment of blasting device sample.

Samples of the blasting device to be tested and all equipment necessary for charging and firing the blasting device, shall be shipped prepaid to MSHA only after MSHA has furnished shipping instructions specifying the quantities and mode of shipment of the materials.

Cross Reference: For regulations with respect to shipment of samples of explosives and explosive articles, see 49 CFR 173.86.

§ 17.7 Place of investigation.

Tests on blasting devices will be made at MSHA's Approval and Certification Center, in the order of receipt of the blasting device, provided an application is on file.

[35 FR 5339, Mar. 31, 1970, as amended at 43 FR 12313, Mar. 24, 1978]

§ 17.8 Consultation.

Any potential applicant (or accredited representative thereof) may visit Approval and Certification Center, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, to discuss, without charge, blasting devices proposed to be submitted for investigation by MSHA. Should preliminary tests appear advisable before submitting the blasting device for formal investigation, MSHA may conduct such tests for the applicant with fees as prescribed in § 17.4.

[35 FR 5339, Mar. 31, 1970, as amended at 43 FR 12313, Mar. 24, 1978]

§ 17.9 Observers at formal investigations and demonstrations.

No one shall be present during any part of the formal investigation conducted by MSHA which leads to approval for permissibility except the necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon by the applicant and MSHA. Upon granting approval for permissibility, MSHA will announce that such approval has been granted to the blasting device and may thereafter conduct, from time to time in its discretion, public demonstrations of the tests conducted on the approved blasting device. Those who attend any part of the investigation, or any public demonstration, shall be present solely as observers; the conduct of the investigation and of any public demonstration shall be controlled wholly by MSHA's personnel. Results of chemical analyses of material and all information contained in the drawing, specifications, and instructions shall be deemed confidential and their disclosure will be appropriately safeguarded by MSHA.

§ 17.10 Chemical and physical tests.

(a) *Chemical tests.* Chemical tests will be made on any components of the blasting device which may be necessary to establish basic data.

(b) *Physical examination.* A physical examination will be made on the components of the blasting device and all dimensions will be checked against the submitted drawings and specifications.

(c) *Gallery tests*—(1) *Test 1.* Each assembly is discharged into a mixture of natural gas and air containing 8.0±0.3 percent of Pittsburgh standard natural gas, at a temperature of 25°±5° C.

(2) *Test 4.* Each assembly is discharged into a mixture of natural gas and air containing 4.0±0.2 percent of Pittsburgh standard natural gas, at a temperature of 25°±5°C., and there will also be 8 pounds of standard bituminous coal dust placed on shelves inside the gallery.

(d) *Pendulum friction test.* For any combustible components or mixtures used in the blasting device 10 trials are made with the steel shoe and, if necessary, with the hard fiber-faced shoe, dropped from a height of 1.5 meters (59 ins.) and with an added weight of 20 kilograms (44 lbs.).

(e) *Gaseous products.* The nature and quantity of gaseous products emitted by the assembled blasting device will be determined.

(f) *Shell temperature test.* The surface temperature of the blasting device will be determined after operating the blasting device under conditions which will produce a "hot shell", i.e., a shell in which the hot gases are trapped and not released.

(g) *Additional tests.* Additional tests will be made if it is determined by MSHA that they are necessary to establish the safety of the blasting device.

§ 17.11 Requirements for approval of permissible blasting devices.

(a) *Gallery tests.* Each assembly of a blasting device must pass without a single ignition, test 1 (35 trials) and test 4 (15 trials) in the gallery.

(b) *Pendulum friction test.* All components thought to constitute an explosive hazard will be tested and such components tested must not show in any trial with the hard fiber-faced shoe on the pendulum friction device a result more unfavorable than an almost indistinguishable local crackling.

(c) *Gaseous products of explosion.* The volume of poisonous gases produced by a blasting device must not exceed 140 liters per shell as determined in the Crawshaw-Jones apparatus.

(d) *Shell temperature test.* The maximum surface temperature attained after operating the blasting device as a "hot shell" shall not exceed 350° C.

(e) *Tests on electrical parts.* If the blasting device is so designed that it cannot be discharged except with a specially designed electric power supply unit made expressly for that purpose, that power supply unit must meet the applicable requirements of MSHA set forth in Parts 18, 24, and 25 of this chapter.

(f) *Misfires.* Approval will not be granted if the blasting device fails to function or misfires in a manner which is deemed to be unsafe by MSHA.

§ 17.12 Change in design.

Special authorization from MSHA must be obtained before the manufacturer makes a change in the design or in the components of an approved blasting device.

§ 17.13 Notification of approval or disapproval.

After MSHA has completed the investigation of a blasting device, a written report covering approval or disapproval of the blasting device will be sent to the applicant. Approval of the blasting device requires that it will be used in conformity with the conditions specified in § 17.16 and any other specific conditions required for handling the blasting device which may be stated in the report.

§ 17.14 Release of test data.

All test data regarding the chemical characteristics of any components of the blasting device are deemed confidential between MSHA and the applicant and will not be publicly released.

§ 17.15 List of permissible blasting devices.

MSHA will maintain a list of permissible blasting devices which will be published from time to time so that interested parties may have information regarding blasting devices which have passed the permissibility tests of MSHA.

§ 17.16 Conditions under which a permissible blasting device is to be used.

A blasting device is permissible only when used under the following conditions:

(a) The blasting device must conform to the specifications for the model as originally approved.

(b) The blasting device must not be discharged in the presence of firedamp that can be detected with a permissible flame safety lamp.

(c) The electrical unit used to fire the blasting device must be suitable for the purpose and meet MSHA's requirements applicable to that particular type of unit. The unit must also be used in a manner prescribed by MSHA.

(d) The blasting device must not be fired until everyone is a safe distance from the shot and protected by adequate cover, having one and, if possible, two right angles between them and the blast.

(e) The coal to be blasted must be undercut or equivalently relieved; the length of shot holes must be at least 6 inches less than the depth of the undercut or equivalent relief; and the shot shall be at least 6 inches away from the side of undercut or equivalent relief.

(f) No blasting device shall be assembled or disassembled in a mine unless such permission is stated in the original approval.

(g) A misfired blasting device may not be opened in the mine unless an exception to this section is included as part of the approval for each specific blasting device. The conditions which constitute a misfire will be specified in the original approval.

(h) A waiting period of 15 minutes shall be required before any personnel is allowed to return to the face after a misfire has occurred.

(i) The blasting device must be used in conformance with all applicable regulations specified in the current edition of the Federal Mine Safety Code.

(j) Other conditions, which will be set down by MSHA as appropriate to the particular blasting device tested, must be observed.

§ 17.17 Tolerances and requirements as applied to field samples.

MSHA will periodically collect and reexamine permissible blasting devices in order to determine whether they conform to the specifications for the blasting device as originally approved and subject to the following tolerances:

(a) *Chemical analysis*—(1) *Moisture.* The tolerances for moisture shall be in accordance with those shown in table 1 of this section.

TABLE 1—LIMIT OF VARIATION (PERCENTAGE OF TOTAL CHEMICAL COMPONENTS) FOR VARIOUS QUANTITIES OF MOISTURE

Quantity of moisture (percent)		Limit of variation (Percent (±))
From—	To—	
0.0	1.0	1.8
1.1	2.0	2.0
2.1	3.0	2.2
3.1	4.0	2.4
4.1	and up	2.6

(2) *Carbonaceous combustible material.* The tolerance shall be ±3 percent of total chemical components.

(3) *Other ingredients or their equivalents.* For ingredients in quantities of 55.1 percent or more, the tolerance shall be ±3 percent of the total chemical components. For ingredients in quantities not exceeding 55 percent, the tolerance shall be in accordance with those shown in Table 2 of this section.

TABLE 2—LIMIT OF VARIATION (PERCENTAGE OF TOTAL CHEMICAL COMPONENTS) FOR VARIOUS QUANTITIES OF INGREDIENT

Quantity of moisture (percent)		Limit of variation (Percent (±))
From—	To—	
0.0	5.0	1.2
5.1	10.0	1.5
10.1	20.0	1.7
20.1	30.0	2.0
30.1	40.0	2.3
40.1	50.0	2.5
50.1	55.0	2.8

(b) *Physical tests of field samples*—(1) *Poisonous gases.* The volume of poisonous gases must not exceed 140 liters per shell.

(2) *Grams of wrapper.* For those blasting devices containing combustible materials as wrapper for any of the components, the tolerance shall be ±2 grams per 100 grams of the component based on that shown for the approved design.

(3) *Weight of chemical components.* The weight of the chemical components in the blasting device shall be ±10 percent of that shown by the basic sample weight.

(4) *Gallery test 1.* The blasting device must pass gallery test 1 (20 trials) using the normal charge.

(5) *Gallery test 4.* The blasting device must pass gallery test 4 (10 trials) using the normal charge.

(6) *Pendulum friction test.* Any chemical component must pass with the hard fiber-faced shoe falling from a heighth of 1.5 meters and with an added weight of 20 kilograms (44 lbs.).

(7) *Temperature.* The maximum temperature attained by a hot shell must not exceed 350° C.

(8) *Conformance with basic data.* The blasting device and all special equipment required for its use must conform to the basic data.

§ 17.18 Field sample failures.

If the blasting device fails to pass any retests specified in § 17.17(b) (1), (4), (5), (6), and (7) the manufacturer will be so notified. As soon as he has been so notified the manufacturer (a) shall promptly withdraw from the market all components specified by MSHA and (b) shall manufacture components in conformity with the basic specifications.

§ 17.19 Variances from prescribed tolerance.

Variance on field sample tests from tolerances specified in § 17.17(a) and (b)(2) and (3) do not directly affect permissibility of the blasting device, but the manufacturer will be notified; he is then obligated to modify his formulation of future blasting devices to bring the blasting device within the prescribed limits and to keep it within such limits.

§ 17.20 Rescission of approval.

MSHA reserves the right to rescind for cause, at any time, any approval granted under this part. Upon such rescission the blasting device will be declared nonpermissible and will be removed from the list of permissible blasting devices.

Section 17.16 of Part 17 deals with the use of permissible blasting devices, and paragraph (i) of that section provides that "The blasting device must be used in conformance with all applicable regulations specified in the current edition of the Federal Mine Safety Code." Except for provisions which impose requirements now expressly dealt with in, or which are inconsistent with, the

Federal Coal Mine Health and Safety Act of 1969, these regulations are as follows:

BITUMINOUS COAL AND LIGNITE UNDERGROUND MINES

ARTICLE IV—EXPLOSIVES AND BLASTING

* * * * *

SEC. 8. *Cardox.* * * *

(c) Where Cardox is used for blasting, the following shall apply:

(1) When Cardox is fired all persons in the vicinity, including the shot firer, shall be around a second corner or in an equally safe place.

(2) Blasting cables shall be as long as may be necessary to assure the safety of the shot firer, attached only after the charge has been placed in the borehole, and maintained in good repair.

(3) Blasting cables shall be kept clear of power wires and all other possible sources of active or stray electric currents.

(4) The charge shall be detonated with a permissible shot-firing unit.

(5) Cardox shall not be shot off the solid, over heavy rock binders or shale, or in a "tight" shot.

(6) Cardox misfires shall not be approached until after the elapse of 15 minutes and shall be handled under the supervision of a competent person.

(7) Misfired shells shall be bled off before complete removal from the hole and marked conspicuously upon such removal.

(8) All protruding wires shall be removed from misfired shells before the shells are removed from the face.

* * * * *

(11) Cardox shells shall not be heated. This does not apply to heat generated when the shell is discharged.

SUBCHAPTER D—ELECTRICAL EQUIPMENT, LAMPS, METHANE DETECTORS; TESTS FOR PERMISSIBILITY; FEES

PART 18—ELECTRIC MOTOR-DRIVEN MINE EQUIPMENT AND ACCESSORIES

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18.98 Enclosures, joints, and fastenings; pressure testing.

18.99 Notice of approval or disapproval; letters of approval and approval plates.

AUTHORITY: Sec. 5, 36 Stat. 370 (30 U.S.C. 7) as amended, and sec. 212(a), 66 Stat. 709 (30 U.S.C. 482(a)). Interpret or apply secs. 2, 3, 36 Stat. 370 (30 U.S.C. 3, 5) as amended, and secs. 201, 209, 66 Stat. 692, 703 (30 U.S.C. 471, 479); secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: 33 FR 4660, Mar. 19, 1968, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12313, Mar. 24, 1978.

Subpart A—General Provisions

§ 18.1 Purpose.

The regulations in this part set forth the requirements to obtain MSHA: (a) Approval of electrically operated machines and accessories intended for use in gassy mines or tunnels, (b) certification of components intended for use on or with approved machines, (c) permission to modify the design of an approved machine or certified component, (d) acceptance of flame-resistant cables, hoses, and conveyor belts, (e) sanction for use of experimental machines and accessories in gassy mines or tunnels; also, procedures for applying for such approval, certification, acceptance for listing; and fees.

§ 18.2 Definitions.

As used in this part—

"Acceptance" means written notification by MSHA that a cable, hose, or conveyor belt has met the applicable requirements of this part and will be listed by MSHA as acceptable flame-resistant auxiliary equipment.

"Acceptance marking" means an identifying marking indicating that the cable, hose, or conveyor belt has been accepted by MSHA for listing as flame resistant.

"Accessory" means associated electrical equipment, such as a distribution or splice box, that is not an integral part of an approved (permissible) machine.

"Assistant Secretary" means the Assistant Secretary of Labor for Mine Safety and Health.

"Afterburning" means the combustion of a flammable mixture that is drawn into a machine compartment after an internal explosion in the compartment.

"Applicant" means an individual, partnership, company, corporation, organization, or association that designs, manufactures, assembles, or controls the assembly of an electrical machine or accessory and seeks approval, certification, or permit, or MSHA acceptance for listing of flame-resistant cable, hose, or conveyor belt.

"Approval" means a formal document issued by MSHA which states that a completely assembled electrical machine or accessory has met the applicable requirements of this part and which authorizes the attachment of an approval plate so indicating.

"Approval plate" means a metal plate, the design of which meets MSHA's requirements, for attachment to an approved machine or accessory, identifying it as permissible for use in gassy mines or tunnels.

"Branch circuit" means an electrical circuit connected to the main circuit, the conductors of which are of smaller size than the main circuit.

"Bureau" means the U.S. Bureau of Mines.

"Certification" means a formal written notification, issued by MSHA, which states that an electrical component complies with the applicable requirements of this part and, therefore, is suitable for incorporation in approved (permissible) equipment.

"Certification label" means a plate, label, or marking, the design of which meets MSHA's requirements, for attachment to a certified component identifying the component as having met the MSHA's requirements for incorporation in a machine to be submitted for approval.

"Component" means an integral part of an electrical machine or accessory that is essential to the functioning of the machine or accessory.

"Connection box" (also known as conduit or terminal box) means an enclosure mounted on an electrical machine or accessory to facilitate wiring, without the use of external splices. (Such boxes may have a joint common with an explosion-proof enclosure provided the adjoining surfaces conform to the requirements of Subpart B of this part.)

"Cylindrical joint" means a joint comprised of two contiguous, concentric, cylindrical surfaces.

"Distribution box" means an enclosure through which one or more portable cables may be connected to a source of electrical energy, and which contains a short-circuit protective device for each outgoing cable.

"Experimental equipment" means any electrical machine or accessory that an applicant or MSHA may desire to operate experimentally for a limited time in a gassy mine or tunnel. (For example, this might include a machine constructed at a mine, an imported machine, or a machine or device designed and developed by MSHA.)

"Explosion-proof enclosure" means an enclosure that complies with the applicable design requirements in Subpart B of this part and is so constructed that it will withstand internal explosions of methane-air mixtures: (1) Without damage to or excessive distortion of its walls or cover(s), and (2) without ignition of surrounding methane-air mixtures or discharge of flame from inside to outside the enclosure.

"Fire-resistant" as applied to conveyor belts means belting that will pass the flame tests hereafter specified.

"Flame-arresting path" means two or more adjoining or adjacent surfaces between which the escape of flame is prevented.

"Flame resistant" as applied to cable, hose, and insultating materials means material that will burn when held in a flame but will cease burning when the flame is removed.

"Flammable mixture" means a mixture of methane or natural gas and air that when ignited will propagate flame. Natural gas containing a high percentage of methane is a satisfactory substitute for pure methane in most tests.

"Gassy mine" means a coal mine classed as "gassy" by MESA or by the State in which the mine is situated.

"Incendive arc or spark" means an arc or spark releasing enough electrical or thermal energy to ignite a flammable mixture of the most easily ignitable composition.

"Intrinsically safe" means incapable of releasing enough electrical or thermal energy under normal or abnormal conditions to cause ignition of a flammable mixture of methane or natural gas and air of the most easily ignitable composition.

"MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to March 9, 1978.

"Mobile equipment" means equipment that is self-propelled.

"MSHA" means the United States Department of Labor, Mine Safety and Health Administration.

"Normal operation" means the regular performance of those functions for which a machine or accessory was designed.

"Permissible equipment" means a completely assembled electrical machine or accessory for which a formal approval has been issued, as authorized by the Administrator, Mining Enforcement and Safety Administration under the Federal Coal Mine Health and Safety Act of 1969 (Pub. L. 91-173, 30 U.S.C. 801 or, after March 9, 1978, by the Assistant Secretary under the Federal Mine Safety and Health Act of 1977 (Pub. L. 91-173, as amended by Pub. L. 95-164, 30 U.S.C. 801).

"Permit" means a formal document, signed by the Assistant Secretary, authorizing the operation of specific experimental equipment in a gassy mine or tunnel under prescribed conditions.

"Plane joint" means two adjoining surfaces in parallel planes.

"Portable cable", or "trailing cable" means a flame-resistant, flexible cable or cord through which electrical energy is transmitted to a permissible machine or accessory. (A portable cable is that portion of the power-supply system between the last short-circuit protective device, acceptable to MSHA, in the system and the machine or accessory to which it transmits electrical energy.)

"Portable equipment" means equipment that may be moved frequently and is constructed or mounted to facilitate such movement.

"Potted component" means a component that is entirely embedded in a solidified insulating material within an enclosure.

"Pressure piling" means the development of abnormal pressure as a result of accelerated rate of burning of a gas-air mixture. (Frequently caused by restricted configurations within enclosures.)

"Qualified representative" means a person authorized by MSHA to determine whether the applicable requirements of this part have been complied with in the original manufacture, rebuilding, or repairing of equipment for which approval, certification, or a permit is sought.

"Splice box" means a portable enclosure in which electrical conductors may be joined.

"Step (rabbet) joint" means a joint comprised of two adjoining surfaces with a change(s) in direction between its inner and outer edges. (A step joint may be composed of a cylindrical portion and a plane portion or of two or more plane portions.)

"Threaded joint" means a joint consisting of a male- and a female-threaded member, both of which are of the same type and gage.

[33 FR 4660, Mar. 19, 1968, as amended at 39 FR 23999, June 28, 1974; 43 FR 12314, Mar. 24, 1978]

§ 18.3 Consultation.

By appointment, applicants or their representatives may visit Approval and Certification Center, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, to discuss a proposed design to be submitted for approval, certification, or acceptance for listing. No charge is made for such consultation and no written report thereof will be made to the applicant.

[33 FR 4660, Mar. 19, 1968, as amended at 43 FR 12314, Mar. 24, 1978]

§ 18.4 Equipment for which approval will be issued.

An approval will be issued only for a complete electrical machine or accessory. Assemblies that include one or more nonexplosion-proof components will not be considered for approval unless such component(s) contains intrinsically safe circuits or is constructed in accordance with paragraph (b), § 18.31.

§ 18.5 Equipment for which certification will be issued.

Certification will be issued for a component or subassembly suitable to incorporate in an approved machine. Certification may be issued for such components as explosion-proof enclosures, battery trays, and connectors.

§ 18.6 Applications.

(a) Investigation leading to approval, certification, extension thereof, or acceptance of cables, hose, or conveyor belt, will be undertaken by MSHA only pursuant to a written application, in duplicate, accompanied by a check, bank draft, or money order, payable to Mine Safety and Health Administration to cover the fees. The application shall be accompanied by all necessary drawings, specifications, descriptions, and related materials, as hereinafter provided. The application, all related matters, and all correspondence concerning it shall be addressed to Approval and Certification Center, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059.

(b) Applications for acceptance of cable and cord as flame resistant shall include the following information: Number and gage of conductors, type of material and identifying compound numbers for conductor insulation, fillers, and jackets. The applicant shall provide other description or specifications as may be subsequently required.

(c) Applications for acceptance of a conveyor belt as fire resistant shall include the following information: Trade name of the conveyor belt, thickness of covers, friction and skim coats, number of plies, type and weight of ply material, and designation of breaker strip or floated ply. The applicant shall provide other description or specifications as may be subsequently required.

(d) Applications for acceptance of hose as flame resistant shall include the following information: Trade name of hose, identification of materials used, including compound numbers, thickness of cover, thickness of tube, and number and weight of plies. The applicant shall provide other description or specifications as may be subsequently required.

(e) Drawings, drawing lists, specifications, wiring diagram, and descriptions shall be adequate in number and detail to identify fully the complete assembly, component parts, and subassemblies. Drawings shall be titled, numbered, dated and shall show the latest revision. Each drawing shall include a warning statement that changes in design must be authorized by MSHA before they are applied to approved equipment. When intrinsically safe circuits are incorporated in a machine or accessory, the wiring diagram shall include a warning statement that any change(s) in the intrinsically safe circuitry or components may result in an unsafe condition. The specifications shall include an assembly drawing(s) (see Figure 1 in Appendix II) showing the overall dimensions of the machine and the identity of each component part which may be listed thereon or separately, as in a bill of material (see Figure 2 in Appendix II). MSHA may accept photographs (minimum size 8″ × 10½″) in lieu of assembly drawing(s). Purchased parts shall be identified by the manufacturer's name, catalog number(s), and rating(s). In the case of standard hardware and miscellaneous parts, such as insulating pieces, size and kind of material shall be specified. All drawings of component parts submitted to MSHA shall be identical to those used in the manufacture of the parts. Dimensions of parts designed to prevent the passage of flame shall specify allowable tolerances. A notation "Do Not Drill Through" or equivalent should appear on drawings with the specifications for all "blind" holes.

(f) MSHA reserves the right to require the applicant to furnish supplementary drawings showing sections through complex flame-arresting paths, such as labyrinths used in conjunction with ball or roller bearings, and also drawings containing dimensions not indicated on other drawings submitted to MSHA.

(g) The applicant may ship his equipment to MSHA for investigation at the time of filing his application and payment of the required fees. Shipping charges shall be prepaid by the applicant.

(h) For a complete investigation leading to approval or certification the applicant shall furnish MSHA with the components necessary for inspection and testing. Expendable components shall be supplied by the applicant to permit continuous operation of the equipment while being tested. If special tools are necessary to assemble or disassemble any component for inspection or test, the applicant shall furnish them with the equipment to be tested.

(i) For investigation of a cable, hose, or conveyor belt, the applicant shall furnish samples as follows:

Cable—a sample having a minimum length of 12 feet;

Hose—a sample having a minimum length of 2 feet;

Conveyor belt—a sample of each type 8 inches long cut across the entire width of the belt.

(j) The applicant shall submit a sample caution statement (see Figure 3 in Appendix II) specifying the conditions for maintaining permissibility of the equipment.

(k) The applicant shall submit a factory-inspection form (see Figure 4 in Appendix II) used to maintain quality control at the place of manufacture or assembly to insure that component parts are made and assembled in strict accordance with the drawings and specifications covering a design submitted to MSHA for approval or certification.

(l) MSHA will accept an application for an approval, a letter of certification, or an acceptance for listing of a product that is manufactured in a country other than the United States provided: (1) All correspondence, specifications, lettering on drawings (metric-system dimensions acceptable), instructions, and related information are in English; and (2) all other requirements of this part are met the same as for a domestic applicant.

OMB Control No. 1219-0066. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[33 FR 4660, Mar. 19, 1968, as amended at 43 FR 12314, Mar. 24, 1978; 47 FR 14696, Apr. 6, 1982]

§ 18.7 Fees.

(a) Detailed inspection of each explosion-proof enclosure	$105
Note: When 20 or less explosion tests are required, the inspection fee shall be $60.	
(b) Explosion tests of each explosion-proof enclosure	70
Note: When 20 or less explosion tests are required, the fee shall be $35.	
(c) Each field inspection of a completely assembled machine or accessory	80
(d) Adequacy tests of potting material	50
(e) Test to determine adequacy of ventilation (battery enclosure)	50
(f) Intrinsic-safety investigation and test	105
(g) High-potential test	50
(h) Surface-temperature test	50
(i) 1. Flame test of cable	50
2. Development flame tests shall be charged at the rate of $10 per specimen. The minimum charge is $25.	
(j) 1. Flame test of conveyor belt or hose conduit	25
2. Development flame tests shall be charged at the rate of $5 per specimen. The minimum charge is $15.	
(k) Impact test each window or lens	25
(l) Thermal shock test each window or lens	25
(m) No charge will be made for inspection or tests made solely for MSHA's information.	
(n) Examining and recording drawings and specifications preparatory to issuing:	
1. Approval	110
2. Certification	55
3. Extension of approval	70
4. Extension of certification	40

Note: When investigation, inspection, or testing is required to be performed at locations other than MSHA's premises, the applicant shall reimburse MSHA for traveling, subsistence and incidental expenses of its representative(s) in accordance with Standardized Government Travel Regulations. Such reimbursement shall be in addition to the fee charged for investigation, inspection, or testing.

Any funds deposited with MSHA that exceed the fees required in accordance with the above charges will be refunded at the completion of the work or applied to future work, as directed by the applicant.

§ 18.8 Date for conducting investigation and tests.

The date of receipt of an application will determine the order of precedence for investigation and testing. If an electrical machine component or accessory fails to meet any of the requirements, it shall lose its order of precedence. If an application is submitted to resume investigation and testing after correction of the cause of failure, it will be treated as a new application and the order of precedence for investigation and testing will be so determined.

§ 18.9 Conduct of investigations and tests.

(a) Prior to the issuance of an approval, certification, or acceptance of a cable, hose, or conveyor belt, only MSHA personnel, representative(s) of the applicant, and such other person(s) as may be mutually agreed upon may observe any part of the investigation or tests. The MSHA will hold as confidential and will not disclose principles or patentable features; nor will it disclose to persons other than the applicant the results of tests, chemical analysis of materials or any details of the applicant's drawings, specifications, instructions, and related material.

(b) Unless notified to the contrary by MSHA, the applicant shall provide assistance in disassembling parts for inspection, preparing parts for testing, and preparing equipment for return shipment. Explosion-proof enclosures shall be drilled and tapped for pipe connections in accordance with instructions supplied by MSHA.

(c) MSHA reserves the right to inspect a complete machine, component part, or accessory at a place other than the Bureau's premises, such as the assembly plant or other location acceptable to MSHA, at the applicant's expense.

(d) Applicants shall be responsible for their representatives present during tests and for observers admitted at their request and shall save the Government harmless in the event of damage to applicant's property or injury to applicant's representatives or to observers admitted at their request.

[33 FR 4660, Mar. 19, 1968; 33 FR 6345, Apr. 26, 1968]

§ 18.10 Notice of approval or disapproval.

(a) Upon completing investigation of a complete assembly of an electrical machine or accessory, MSHA will issue to the applicant either a written notice of approval or a written notice of disapproval, as the case may require. No informal notification of approval will be issued. If a notice of disapproval is issued, it will be accompanied by details of the defects, with recommendations for possible correction. MSHA will not disclose, except to the applicant, any information upon which a notice of disapproval has been issued.

(b) A formal notice of approval will be accompanied by a list of drawings, specifications, and related material, covering the details of design and construction of the equipment upon which the approval is based. Applicants shall keep exact duplicates of the drawings, specifications, and descriptions that relate to equipment for which an approval has been issued, and the drawings and specifications shall be adhered to exactly in production of the approved equipment.

(c) An applicant shall not advertise or otherwise represent his equipment as approved (permissible) until he has received MSHA's formal notice of approval.

§ 18.11 Approval plate.

(a)(1) The notice of approval will be accompanied by a photograph of an approval plate, bearing the emblem of Mine Safety and Health Administration, the name of the complete assembly, the name of the applicant, and spaces for the approval number, serial number, and the type or model of machine.

(2) An extension of approval will not affect the original approval number except that the extension number shall be added to the original approval number on the approval plate. (Example: Original approval No. 2G-3000; seventh extension No. 2G-3000-7.)

(b) The applicant shall reproduce the design on a separate plate, which shall be attached in a suitable place, on each complete assembly to which it relates. The size, type, location, and method of attaching an approval plate are subject to MSHA's concurrence. The method for affixing the approval plate shall not impair any explosion-proof feature of the equipment.

(c) The approval plate identifies as permissible the machine or accessory to which it is attached, and use of the approval plate obligates the applicant to whom the approval was issued to maintain in his plant the quality of each complete assembly and guarantees that the equipment is manufactured and assembled according to the drawings, specifications, and descriptions upon which the approval and subsequent extension(s) of approval were based.

(d) A completely assembled approved machine with an integral dust collector shall bear an approval plate indicating that the requirements of Part 33 of this chapter (Bureau of Mines Schedule 25B), have been complied with. Approval numbers will be assigned under each part of such joint approvals.

[33 FR 4660, Mar. 19, 1968, as amended at 43 FR 12314, Mar. 24, 1978]

§ 18.12 Letter of certification.

(a) A letter of certification may be issued by MSHA for a component intended for incorporation in a complete machine or accessory for which an approval may be subsequently issued. A letter of certification will be issued to an applicant when a component has met all the applicable requirements of this part. Included in the letter of certification will be an assigned MSHA certification number that will identify the certified component.

(b) A letter of certification will be accompanied by a list of drawings, specifications, and related material covering the details of design and construction of a component upon which the letter of certification is based. Applicants shall keep exact duplicates of the drawings, specifications, and descriptions that relate to the component for which a letter of certification has been issued; and the drawings and specifications shall be adhered to exactly in production of the certified component.

(c) A component shall not be represented as certified until the applicant has received MSHA's letter of certification for the component. Certified components are not to be represented as "approved" or "permissible" because such terms apply only to completely assembled machines or accessories.

§ 18.13 Certification plate.

Each certified component shall be identified by a certification plate attached to the component in a manner acceptable to MSHA. The method of attachment shall not impair any explosion-proof characteristics of the component. The plate shall be of serviceable material, acceptable, to MSHA, and shall contain the following:

Certified as complying with the applicable requirements of 30 CFR part ———.
Certification No. ————.

The blank spaces shall be filled with appropriate designations. Inclusion of the information on a company name plate will be permitted provided the plate is made of material acceptable to MSHA.

§ 18.14 Identification of tested noncertified explosion-proof enclosures.

An enclosure that meets all applicable requirements of this part, but has not been certified by MSHA, shall be identified by a permanent marking on it in a conspicuous location. The design of such marking shall consist of capital letters USMSHA not less than ¼ inch in height, enclosed in a circle not less than 1 inch in diameter.

[33 FR 4660, Mar. 19, 1968, as amended at 43 FR 12314, Mar. 24, 1978]

§ 18.15 Changes after approval or certification.

If an applicant desires to change any feature of approved equipment or a certified component, he shall first obtain MSHA's concurrence pursuant to the following procedure:

(a) Application shall be made as for an original approval or letter of certification requesting that the existing approval or certification be extended to cover the proposed change(s) and shall be accompanied by drawings, specifications, and related information, showing the change(s) in detail.

(b) The application will be examined by MSHA to determine whether inspection or testing will be required. Testing will be required if there is a possibility that the change(s) may adversely affect safety.

(c) If the change(s) meets the requirements of this part, a formal extension of approval or certification will be issued, accompanied by a list of new or revised drawings, specifications, and related information to be added to those already on file for the original approval or certification.

(d) Revisions in drawings or specifications that do not involve actual change in the explosion-proof features of equipment may be handled informally, without fee.

§ 18.16 Withdrawal of approval, certification, or acceptance.

MSHA reserves the right to rescind, for cause, any approval, certification, acceptance, or extension thereof, issued under this part.

Subpart B—Construction and Design Requirements

§ 18.20 Quality of material, workmanship, and design.

(a) Electrically operated equipment intended for use in coal mines shall be rugged in construction and shall be designed to facilitate inspection and maintenance.

(b) MSHA will test only electrical equipment that in the opinion of its qualified representatives is constructed of suitable materials, is of good quality workmanship, based on sound engineering principles, and is safe for its intended use. Since all possible designs, circuits, arrangements, or combinations of components and materials cannot be foreseen, MSHA reserves the right to modify design, construction, and test requirements to obtain the same degree of protection as provided by the tests described in Subpart C of this part.

(c) Moving parts, such as rotating saws, gears, and chain drives, shall be guarded to prevent personal injury.

(d) Flange joints and lead entrances shall be accessible for field inspection, where practicable.

(e) An audible warning device shall be provided on each mobile machine that travels at a speed greater than 2.5 miles per hour.

(f) Brakes shall be provided for each wheel-mounted machine, unless design of the driving mechanism will preclude accidental movement of the machine when parked.

(g) A headlight and red light-reflecting material shall be provided on both front and rear of each mobile transportation unit that travels at a speed greater than 2.5 miles per hour. Red light-reflecting material should be provided on each end of other mobile machines.

§ 18.21 Machines equipped with powered dust collectors.

Powered dust collectors on machines submitted for approval shall meet the applicable requirements of Part 33 of this chapter (Bureau of Mines Schedule 25B), and shall bear the approval number assigned by MSHA.

§ 18.22 Boring-type machines equipped for auxiliary face ventilation.

Each boring-type continuous-mining machine that is submitted for approval shall be constructed with an unobstructed continuous space(s) of not less than 200 square inches total cross-sectional area on or within the machine to which flexible tubing may be attached to facilitate auxiliary face ventilation.

§ 18.23 Limitation of external surface temperatures.

The temperature of the external surfaces of mechanical or electrical components shall not exceed 150° C. (302° F.) under normal operating conditions.

§ 18.24 Electrical clearances.

The clearance between live parts and casings shall be sufficient to minimize the possibility of arcs striking the casings. Where space is limited, the casing shall be lined with adequate insulation.

§ 18.25 Combustible gases from insulating material.

(a) Insulating materials that give off flammable or explosive gases when decomposed electrically shall not be used within enclosures where the materials are subjected to destructive electrical action.

(b) Parts coated or impregnated with insulating materials shall be heat-treated to remove any combustible solvent(s) before assembly in an explosion-proof enclosure. Air-drying insulating materials are excepted.

§ 18.26 Static electricity.

Nonmetallic rotating parts, such as belts and fans, shall be provided with a means to prevent an accumulation of static electricity.

§ 18.27 Gaskets.

A gasket(s) shall not be used between any two surfaces forming a flame-arresting path except as follows:

(a) A gasket of lead, elastomer, or equivalent will be acceptable provided the gasket does not interfere with an acceptable metal-to-metal joint.

(b) A lead gasket(s) or equivalent will be acceptable between glass and a hard metal to form all or a part of a flame-arresting path.

§ 18.28 Devices for pressure relief, ventilation, or drainage.

(a) Devices for installation on explosion-proof enclosures to relieve pressure, ventilate, or drain will be acceptable provided the length of the flame-arresting path and the clearances or size of holes in perforated metal will prevent discharge of flame in explosion tests.

(b) Devices for pressure relief, ventilation, or drainage shall be constructed of materials that resist corrosion and distortion, and be so designed that they can be cleaned readily. Provision shall be made for secure attachment of such devices.

(c) Devices for pressure relief, ventilation, or drainage will be acceptable for application only on enclosures with which they are explosion tested.

§ 18.29 Access openings and covers, including unused lead-entrance holes.

(a) Access openings in explosion-proof enclosures will be permitted only where necessary for maintenance of internal parts such as motor brushes and fuses.

(b) Covers for access openings shall meet the same requirements as any other part of an enclosure except that threaded covers shall be secured against loosening, preferably with screws having heads requiring a special tool. (See Figure 1 in Appendix II.)

(c) Holes in enclosures that are provided for lead entrances but which are not in use shall be closed with metal plugs secured by spot welding, brazing, or equivalent. (See Figure 10 in Appendix II.)

§ 18.30 Windows and lenses.

(a) MSHA may waive testing of materials for windows or lenses except headlight lenses. When tested, material for windows or lenses shall meet the test requirements prescribed in § 18.66 and shall be sealed in place or provided with flange joints in accordance with § 18.31.

(b) Windows or lenses shall be protected from mechanical damage by structural design, location, or guarding. Windows or lenses, other than headlight lenses, having an exposed area greater than 8 square inches, shall be provided with guarding or equivalent.

§ 18.31 Enclosures—joints and fastenings.

(a) Explosion-proof enclosures:

(1) Cast or welded enclosures shall be designed to withstand a minimum internal pressure of 150 pounds per square inch (gage). Castings shall be free from blowholes.

(2) Welded joints forming an enclosure shall have continuous gas-tight welds. All welds shall be made in accordance with American Welding Society standards.

(3) External rotating parts shall not be constructed of aluminum alloys containing more than 0.5 percent magnesium.

(4) MSHA reserves the right to require the applicant to conduct static-pressure tests on each enclosure when MSHA determines that the particular design will not permit complete visual inspection or when the joint(s) forming an enclosure is welded on one side only (see § 18.67).

(5) Threaded covers shall be designed with Class 1 (coarse, loose fitting) threads. The flame-arresting path of threaded joints shall conform to the requirements of paragraph (a)(6) of this section.

(6) Enclosures shall meet the following requirements based on the internal volumes of the empty enclosure.

	Volume of empty enclosure		
	Less than 45 cu. in.	45 to 124 cu. in., inclusive	More than 124 cu. in.
Minimum thickness of material for walls	1/8"	3/16"	1/4"
Minimum thickness of material for flanges	1/4" [1]	3/8" [2]	1/2" [2]
Minimum thickness of material for cover	1/4" [1]	3/8" [2]	1/2" [2]
Minimum width of joint—all in one plane	1/2"	3/4"	1"
Maximum clearance—joint all in one plane	0.002"	0.003"	0.004"
Minimum width of joint, portions of which are in different planes—cylinders or equivalent.	3/8" [3]	5/8" [3]	3/4" [3]
Maximum clearances—joint in two or more planes, cylinders or equivalent:			
(a) Portion perpendicular to plane	0.008" [4]	0.008" [4]	0.008" [4]
(b) Plane portion	0.006"	0.006"	0.006"
Maximum bolt [5] spacing—joints all in one plane	6" with minimum of 4 bolts.	6" with minimum of 4 bolts.	6"
Maximum bolt spacing—joints, portions of which are in different planes.	(6)	(6)	(6)
Minimum diameter of bolt (without regard to type of joint).	1/4"	1/4"	3/8"
Minimum thread engagement [7]	1/4"	1/4"	3/8"
Maximum diametrical clearance between bolt body and unthreaded holes through which it passes [8]	1/64"	1/32"	1/16"

	Volume of empty enclosure		
	Less than 45 cu. in.	45 to 124 cu. in., inclusive	More than 124 cu. in.
Minimum distance from interior of enclosure to the edge of a bolt hole:			
Joint—minimum width 1"			7/16".[9]
Joint—less than 1" wide	⅛"	3/16"	
CYLINDRICAL JOINTS			
Shafts centered by ball or roller bearings:			
Minimum length of flame-arresting path	½"	¾"	1".
Maximum radial clearance	0.010"	0.0125"	0.015".
Shafts through journal bearings:[10]			
Minimum length of flame-arresting path	½"	¾"	1".
Maximum radial clearance	0.003"	0.004"	0.005".
Other than shafts:			
Minimum length of flame-arresting path	½"	¾"	1".
Maximum radial clearance	0.0015"	0.002"	0.003".

[1] 1/32-inch less is allowable for machining rolled plate.

[2] 1/16-inch less is allowable for machining rolled plate.

[3] If only two planes are involved, neither portion of a joint shall be less than ⅛-inch wide, unless the wider portion conforms to the same requirements as those for a joint that is all in one plane. If more than two planes are involved (as in labyrinths or tongue-and-groove joints) the combined lengths of those portions having prescribed clearances will be considered.

[4] The allowable diametrical clearance is 0.008 inch when the portion perpendicular to the plane portion is ¼ inch or greater in length. If the perpendicular portion is more than ⅛ inch but less than ¼ inch wide, the diametrical clearance shall not exceed 0.006 inch.

[5] Where the term "bolt" is used, it refers to a machine bolt or a cap screw, and for either of these studs may be substituted provided the studs bottom in blind holes, are completely welded in place, or the bottom of the hole is closed with a secured plug. Bolts shall be provided at all corners.

[6] Adequacy of bolt spacing will be judged on basis of size and configuration of the enclosure, strength of materials, and explosion test results.

[7] In general, minimum thread engagement shall be equal to or greater than the diameter of the bolt specified.

[8] Threaded holes for fastening bolts shall be machined to remove burrs or projections that affect planarity of a surface forming a flame-arresting path.

[9] Less than 7/16-inch (¼-inch minimum) will be acceptable provided the diametrical clearance for fastening bolts does not exceed 1/32 inch.

[10] Shafts or operating rods through journal bearings shall be not less than ¼-inch in diameter. The length of fit shall not be reduced when a pushbutton is depressed. Operating rods shall have a shoulder or head on the portion inside the enclosure. Essential parts riveted or bolted to the inside portion will be acceptable in lieu of a head or shoulder, but cotter pins and similar devices will not be acceptable.

(b) Enclosures for potted components: Enclosures shall be rugged and constructed with materials having 75 percent, or greater, of the thickness and flange width specified in paragraph (a) of this section. These enclosures shall be provided with means for attaching hose conduit, unless energy carried by the cable is intrinsically safe.

(c) No assembly will be approved that requires the opening of an explosion-proof enclosure to operate a switch, rheostat, or other device during normal operation of a machine.

§ 18.32 Fastenings—additional requirements.

(a) Bolts, screws, or studs shall be used for fastening adjoining parts to prevent the escape of flame from an enclosure. Hinge pins or clamps will be acceptable for this purpose provided MSHA determines them to be equally effective.

(b) Lockwashers shall be provided for all bolts, screws, and studs that secure parts of explosion-proof enclosures. Special fastenings designed to prevent loosening will be acceptable in lieu of lockwashers, provided MSHA determines them to be equally effective.

(c) Fastenings shall be as uniform in size as practicable to preclude improper assembly.

(d) Holes for fastenings shall not penetrate to the interior of an explosion-proof enclosure, except as provided in paragraph (a)(9) of § 18.34, and shall be threaded to insure that a specified bolt or screw will not bottom even if its lockwasher is omitted.

(e) A minimum of ⅛-inch of stock shall be left at the center of the bottom of each hole drilled for fastenings.

(f) Fastenings used for joints on explosion-proof enclosures shall not be used for attaching nonessential parts or for making electrical connections.

(g) The acceptable sizes for and spacings of fastenings shall be determined by the size of the enclosure, as indicated in § 18.31.

(h) MSHA reserves the right to conduct explosion tests with standard bolts, nuts, cap screws, or studs substituted for any special high-tensile strength fastening(s) specified by the applicant.

§ 18.33 Finish of surface joints.

Flat surfaces between bolt holes that form any part of a flame-arresting path shall be plane to within a maximum deviation of one-half the maximum clearance specified in § 18.31(a)(6). All metal surfaces shall be finished in manufacture to not more than 250 microinches. A thin film of nonhardening preparation to inhibit rusting may be applied to finished steel surfaces.

§ 18.34 Motors.

(a) *General.* (1) Motors shall have explosion-proof enclosures.

(2) Motors submitted to MSHA for test shall be equipped with unshielded bearings regardless of whether that type of bearing is specified.

(3) MSHA reserves the right to test motors with the maximum clearance specified between the shaft and the mating part which forms the required flame-arresting path. Also reserved is the right to remachine these parts, at the applicant's expense, to specified dimensions to provide the maximum clearance.

NOTE: For example, a shaft with a diameter greater than 2 inches at the flame-arresting portion might require such machining.

(4) Ball and roller bearings and oil seals will not be acceptable as flame-arresting paths; therefore, a separate path shall be provided between the shaft and another part, preferably inby the bearing. The length and clearances of such flame-arresting path shall conform to the requirements of § 18.31.

(5) Labyrinths or other arrangements that provide change(s) in direction of escaping gases will be acceptable but the use of small detachable pieces shall not be permitted unless structurally unavoidable. The lengths of flame-arresting path(s) and clearance(s) shall conform to the requirements of § 18.31.

(6) The widths of oil grooves and grooves for holding oil seals will be deducted in measuring the widths of flame-arresting paths.

NOTE: Oil seals will be removed from motors prior to explosion tests and therefore may be omitted from motors submitted for investigation.

(7) Openings for filling and draining bearing lubricants shall be so located as to prevent escape of flame through them.

(8) An outer bearing cap will not be considered as forming any part of a flame-arresting path unless the cap is used as a bearing cartridge.

NOTE: The outer bearing cap will be omitted during explosion tests unless it houses the bearing

(9) If unavoidable, holes may be made through motor casings for bolts, studs, or screws to hold essential parts such as pole pieces, brush rigging, and bearing cartridges. Such parts shall be attached to the casing by at least two fastenings. The threaded holes in these parts shall be blind, unless the fastenings are inserted from the inside, in which case the fastenings shall not be accessible with the armature of the motor in place.

(b) *Direct-current motors.* For direct-current motors with narrow interpoles, the distance from the edge of the pole piece to any bolt hole in the frame shall be not less than ⅛ inch. If the distance is ⅛ to ¼ inch, the diametrical clearance for the pole bolt shall not exceed 1/64 inch for not less than ½ inch through the frame. Furthermore, the pole piece shall have the same radius as the inner surface of the frame. Pole pieces may be shimmed as necessary.

(c) *Alternating-current motors.* Stator laminations that form a part of an explosion-proof enclosure will be acceptable provided; (1) The laminations and their end rings are fastened together under pressure; (2) the joint between the end rings and the laminations is not less than ¼ inch, but preferably as close to 1 inch as possible; and (3) it shall be impossible to insert a 0.0015-inch thickness gage to a depth exceeding ⅛ inch between adjacent laminations or between end rings and laminations.

(d) *Small motors (alternating- and direct-current).* Motors having internal free volume not exceeding 350 cubic inches and joints not exceeding 32 inches in outer circumference will be acceptable for investigation if provided with rabbet joints between the stator frame and the end bracket having the following dimensions:

DIMENSIONS OF RABBET JOINTS—INCHES

Minimum total width	Min width of clamped radial portion	Max clearance of radial portion	Max diametrical clearance at axial portion
⅜	3/64	0.0015	0.003
⅜	3/64	.002	.003
½	3/32	.002	.004

§ 18.35 Portable (trailing) cables and cords.

(a) Portable cables and cords used to conduct electrical energy to face equipment shall conform to the following:

(1) Have each conductor of a current-carrying capacity consistent with the Insulated Power Cable Engineers Association (IPCEA) standards. (See Tables 1 and 2 in Appendix I.)

(2) Have current-carrying conductors not smaller than No. 14 (AWG). Cords with sizes 14 to 10 (AWG) conductors shall be constructed with heavy jackets, the diameters of which are given in Table 6 in Appendix I.

(3) Have flame-resistant properties. (See § 18.64.)

(4) Have short-circuit protection at the outby (circuit-connecting) end of ungrounded conductors. (See Table 8 in Appendix I.) The fuse rating or trip setting shall be included in the assembler's specifications.

(5) Ordinarily the length of a portable (trailing) cable shall not exceed 500 feet. Where the method of mining requires the length of a portable (trailing) cable to be more than 500 feet, such length of cable shall be permitted only under the following prescribed conditions:

(i) The lengths of portable (trailing) cables shall not exceed those specified in Table 9, Appendix I, titled "Specifications for Portable Cables Longer Than 500 Feet."

(ii) Short-circuit protection shall be provided by a protective device with an instantaneous trip setting as near as practicable to the maximum starting-current-inrush value, but the setting shall not exceed the trip value specified in MSHA approval for the equipment for which the portable (trailing) cable furnishes electric power.

(6) Have nominal outside dimensions consistent with IPCEA standards. (See Tables 4, 5, 6, and 7 in Appendix I.)

(7) Have conductors of No. 4 (AWG) minimum for direct-current mobile haulage units or No. 6 (AWG) minimum for alternating-current mobile haulage units.

(8) Have not more than five well-made temporary splices in a single length of portable cable.

(b) Sectionalized portable cables will be acceptable provided the connectors used inby the last open crosscut in a gassy mine meet the requirements of § 18.41.

(c) A portable cable having conductors smaller than No. 6 (AWG), when used with a trolley tap and a rail clamp, shall have well insulated single conductors not smaller than No. 6 (AWG) spliced to the outby end of each conductor. All splices shall be made in a workmanlike manner to insure good electrical conductivity, insulation, and mechanical strength.

(d) Suitable provisions shall be made to facilitate disconnection of portable cable quickly and conveniently for replacement.

[33 FR 4660, Mar. 19, 1968; 33 FR 6343, Apr. 26, 1968]

§ 18.36 Cables between machine components.

(a) Cables between machine components shall have: (1) Adequate current-carrying capacity for the loads involved, (2) short-circuit protection, (3) insulation compatible with the impressed voltage, and (4) flame-resistant properties unless totally enclosed within a flame-resistant hose conduit or other flame-resistant material.

(b) Cables between machine components shall be: (1) Clamped in place to prevent undue movement, (2) protected from mechanical damage by position, flame-resistant hose conduit, metal tubing, or troughs (flexible or threaded rigid metal conduit will not be acceptable), (3) isolated from hydraulic lines, and (4) protected from abrasion by removing all sharp edges which they might contact.

(c) Cables (cords) for remote-control circuits extending from permissible equipment will be exempted from the requirements of conduit enclosure provided the total electrical energy carried is intrinsically safe or that the cables are constructed with heavy jackets, the sizes of which are stated in Table 6 of Appendix I. Cables (cords) provided with hose-conduit protection shall have a tensile strength not less than No. 16 (AWG) three-conductor, type SO cord. (Reference: 7.7.7 IPCEA Pub. No. S-19-81, Fourth Edition.) Cables (cords) constructed with heavy jackets shall consist of conductors not smaller than No. 14 (AWG) regardless of the number of conductors.

§ 18.37 Lead entrances.

(a) Insulated cable(s), which must extend through an outside wall of an explosion-proof enclosure, shall pass through a stuffing-box lead entrance. All sharp edges that might damage insulation shall be removed from stuffing boxes and packing nuts.

(b) Stuffing boxes shall be so designed, and the amount of packing used shall be such, that with the packing properly compressed, the gland nut still has a clearance distance of ⅛ inch or more to travel without meeting interference by parts other than packing. (See Figures 8, 9, and 10 in Appendix II.)

(c) Packing nuts and stuffing boxes shall be secured against loosening.

(d) Compressed packing material shall be in contact with the cable jacket for a length of not less than ½ inch.

(e) Special requirements for glands in which asbestos-packing material is specified are:

(1) Asbestos-packing material shall be untreated, not less than 3/16-inch diameter if round, or not less than 3/16 by 3/16 inch if square. The width of the space for packing material shall not exceed by more than 50 percent the diameter or width of the uncompressed packing material.

(2) The allowable diametrical clearance between the cable and the holes in the stuffing box and packing nut shall not exceed 75 percent of the nominal diameter or width of the packing material.

(f) Special requirements for glands in which a compressible material (example—synthetic elastomers) other than asbestos is specified, are:

(1) The packing material shall be flame resistant.

(2) The radial clearance between the cable jacket and the nominal inside diameter of the packing material shall not exceed 1/32-inch, based on the nominal specified diameter of the cable.

(3) The radial clearance between the nominal outside diameter of the packing material and the inside wall of the stuffing box (that portion into which the packing material fits) shall not exceed 1/32-inch.

§ 18.38 Leads through common walls.

(a) Insulated studs will be acceptable for use in a common wall between two explosion-proof enclosures.

(b) When insulated wires or cables are extended through a common wall between two explosion-proof enclosures in insulating bushings, such bushings shall be not less than 1-inch long and the diametrical clearance between the wire or cable insulation and the holes in the bushings shall not exceed 1/16-inch (based on the nominal specified diameter of the cable). The insulating bushings shall be secured in the metal wall.

(c) Insulated wires or cables conducted from one explosion-proof enclosure to another through conduit, tubing, piping, or other solid-wall passageways will be acceptable provided one end of the passageway is plugged, thus isolating one enclosure from the other.

Glands of secured bushings with close-fitting holes through which the wires or cables are conducted will be acceptable for plugging. The tubing or duct specified for the passageway shall be brazed or welded into the walls of both explosion-proof enclosures with continuous gas-tight welds.

(d) If wires and cables are taken through openings closed with sealing compounds, the design of the opening and characteristics of the compounds shall be such as to hold the sealing material in place without tendency of the material to crack or flow out of its place. The material also must withstand explosion tests without cracking or loosening.

(e) Openings through common walls between explosion-proof enclosures not provided with bushings or sealing compound, shall be large enough to prevent pressure piling.

§ 18.39 Hose conduit.

Hose conduit shall be provided for mechanical protection of all machine cables that are exposed to damage. Hose conduit shall be flame resistant and have a minimum wall thickness of 3/16 inch. The flame resistance of hose conduit will be determined in accordance with the requirements of § 18.65.

§ 18.40 Cable clamps and grips.

Insulated clamps shall be provided for all portable (trailing) cables to prevent strain on the cable terminals of a machine. Also insulated clamps shall be provided to prevent strain on both ends of each cable or cord leading from a machine to a detached or separately mounted component. Cable grips anchored to the cable may be used in lieu of insulated strain clamps. Supporting clamps for cables used for wiring around machines shall be provided in a manner acceptable to MSHA.

§ 18.41 Plug and receptacle-type connectors.

(a) Plug and receptacle-type connectors for use inby the last open crosscut in a gassy mine shall be so designed that insertion or withdrawal of a plug cannot cause incendive arcing or sparking. Also, connectors shall be so designed that no live terminals, except as hereinafter provided, are exposed upon withdrawal of a plug. The following types will be acceptable:

(1) Connectors in which the mating or separation of the male and female electrodes is accomplished within an explosion-proof enclosure.

(2) Connectors that are mechanically or electrically interlocked with an automatic circuit-interrupting device.

(i) *Mechanically interlocked connectors.* If a mechanical interlock is provided the design shall be such that the plug cannot be withdrawn before the circuit has been interrupted and the circuit cannot be established with the plug partially withdrawn.

(ii) *Electrically interlocked connectors.* If an electrical interlock is provided, the total load shall be removed before the plug can be withdrawn and the electrical energy in the interlocking pilot circuit shall be intrinsically safe, unless the pilot circuit is opened within an explosion-proof enclosure.

(3) Single-pole connectors for individual conductors of a circuit used at terminal points shall be so designed that all plugs must be completely inserted before the control circuit of the machine can be energized.

(b) Plug and receptacle-type connectors used for sectionalizing the cables outby the last open crosscut in a gassy mine need not be explosion-proof or electrically interlocked provided such connectors are designed and constructed to prevent accidental separation.

(c) Conductors shall be securely attached to the electrodes in a plug or receptacle and the connections shall be totally enclosed.

(d) Molded-elastomer connectors will be acceptable provided:

(1) Any free space within the plug or receptacle is isolated from the exterior of the plug.

(2) Joints between the elastomer and metal parts are not less than 1 inch wide and the elastomer is either bonded to or fits tightly with metal parts.

(e) The contacts of all line-side connectors shall be shielded or recessed adequately.

(f) For a mobile battery-powered machine, a plug padlocked to the receptacle will be acceptable in lieu of an interlock provided the plug is held in place by a threaded ring or equivalent mechanical fastening in addition to the padlock. A connector within a padlocked enclosure will be acceptable.

§ 18.42 Explosion-proof distribution boxes.

(a) A cable passing through an outside wall(s) of a distribution box shall be conducted either through a packing gland or an interlocked plug and receptacle.

(b) Short-circuit protection shall be provided for each branch circuit connected to a distribution box. The current-carrying capacity of the specified connector shall be compatible with the automatic circuit-interrupting device.

(c) Each branch receptacle shall be plainly and permanently marked to indicate its current-carrying capacity and each receptacle shall be such that it will accommodate only an appropriate plug.

(d) Provision shall be made to relieve mechanical strain on all connectors to distribution boxes.

§ 18.43 Explosion-proof splice boxes.

Internal connections shall be rigidly held and adequately insulated. Strain clamps shall be provided for all cables entering a splice box.

§ 18.44 Battery boxes and batteries (exceeding 12 volts).

(a) A battery box (tray), including the cover, shall be made of steel the thickness of which is to be based on the total weight of the battery and tray, as follows:

Weight	Thickness
2,000 lb maximum	3/16"
2,001–4,500 lb	1/4"
Over 4,500 lb	5/16"

Materials other than steel that provide equivalent strength will be considered.

(b) Battery-box covers shall be lined with a flame-resistant insulating material, preferably bonded to the inside of the cover, unless equivalent protection is provided.

(c) Battery-box covers shall be provided with a means for securing them in closed position.

(d) Battery boxes shall be adequately ventilated. The size and locations of openings for ventilation shall prevent access to cell terminals.

(e) Battery cells shall be insulated from the battery-box walls and supported on insulating material. Insulating materials that may be subject to chemical reaction with electrolyte shall be treated to resist such action.

(f) Drainage holes shall be provided in the bottom of each battery box.

(g) Cell terminals shall be "burned" on. Bolted connectors (two-bolt type) may be accepted on end terminals.

(h) Battery connections shall be so designed that battery potential will be minimized between adjacent cells, and total battery potential shall not be available between adjacent cells.

(i) Cables within a battery box shall be protected against abrasion of the insulation.

(j) Each wire or cable leaving a battery box on storage-battery-operated equipment shall have short-circuit protection in an explosion-proof enclosure as close as practicable to the battery terminals. A protective device installed within a nearby explosion-proof enclosure will be acceptable provided the exposed portion of the cable from the battery box to the enclosure does not exceed approximately 36 inches in length; in addition, special care shall be taken to protect each wire or cable from damage.

(k) A diagram showing the battery connections between cells and between trays shall be submitted. The number, type, rating, and manufacturer of the battery cells shall be included in specifications.

§ 18.45 Cable reels.

(a) A self-propelled machine, that receives electrical energy through a portable cable and is designed to travel at speeds exceeding 2.5 miles per hour, shall have a mechanically, hydraulically, or electrically driven reel upon which to wind the portable cable.

(b) The enclosure for moving contacts or slip rings of a cable reel shall be explosion-proof.

(c) Cable-reel bearings shall not constitute an integral part of a circuit for transmitting electrical energy.

(d) Cable reels for shuttle cars and locomotives shall maintain positive tension on the portable cable during reeling and unreeling. Such tension shall only be high enough to prevent a machine from running over its own cable(s).

(e) Cable reels and spooling devices shall be insulated with flame-resistant material.

(f) The maximum speed of travel of a machine when receiving power through a portable (trailing) cable shall not exceed 6 miles per hour.

(g) Diameters of cable reel drums and sheaves should be large enough to prevent undue bending strain on cables.

§ 18.46 Headlights.

(a) Headlights shall be constructed as explosion-proof enclosures.

(b) Headlights shall be mounted to provide illumination where it will be most effective. They shall be protected from damage by guarding or location.

(c) Lenses for headlights shall be glass or other suitable material with physical characteristics equivalent to ½-inch thick tempered glass, such as "Pyrex." Lenses shall meet the requirements of the tests prescribed in § 18.66.

(d) Lenses permanently fixed in a ring with lead, epoxy, or equivalent will be acceptable provided only lens assemblies meeting the original manufacturer's specifications are used as replacements.

(e) If a single lead gasket is used, the contact surface of the opposite side of the lens shall be plane within a maximum deviation of 0.002 inch.

§ 18.47 Voltage limitation.

(a) A tool or switch held in the operator's hand or supported against his body will not be approved with a nameplate rating exceeding 300 volts direct current or alternating current.

(b) A battery-powered machine shall not have a nameplate rating exceeding 240 volts, nominal (120 lead-acid cells or equivalent).

(c) Other direct-current machines shall not have a nameplate rating exceeding 550 volts.

(d) An alternating-current machine shall not have a nameplate rating exceeding 660 volts, except that a machine may have a nameplate rating greater than 660 volts but not exceeding 4,160 volts when the following conditions are complied with:

(1) Adequate clearances and insulation for the particular voltage(s) are provided in the design and construction of the equipment, its wiring, and accessories.

(2) A continuously monitored, fail-safe grounding system is provided that will maintain the frame of the equipment and the frames of all accessory equipment at ground potential. Also, the equipment, including its controls and portable (trailing) cable, will be deenergized automatically upon the occurrence of an incipient ground fault. The ground-fault-tripping current shall be limited by grounding resistor(s) to that necessary for dependable relaying. The maximum ground-fault-tripping current shall not exceed 25 amperes.

(3) All high voltage switch gear and control for equipment having a nameplate rating exceeding 1,000 volts are located remotely and operated by remote control at the main equipment. Potential for remote control shall not exceed 120 volts.

(4) Portable (trailing) cable for equipment with nameplate ratings from 661 volts through 1,000 volts shall include grounding conductors, a ground check conductor, and grounded metallic shields around each power conductor or a grounded metallic shield over the assembly; except that on machines employing cable reels, cables without shields may be used if the insulation is rated 2,000 volts or more.

(5) Portable (trailing) cable for equipment with nameplate ratings from 1,001 volts through 4,160 volts shall include grounding conductors, a ground check conductor, and grounded metallic shields around each power conductor.

(6) MSHA reserves the right to require additional safeguards for high-voltage equipment, or modify the re-

quirements to recognize improved technology.

§ 18.48 Circuit-interrupting devices.

(a) Each machine shall be equipped with a circuit-interrupting device by means of which all power conductors can be deenergized at the machine. A manually operated controller will not be acceptable as a service switch.

(b) When impracticable to mount the main-circuit-interrupting device on a machine, a remote enclosure will be acceptable. When contacts are used as a main-circuit-interrupting device, a means for opening the circuit shall be provided at the machine and at the remote contactors.

(c) Separate two-pole switches shall be provided to deenergize power conductors for headlights or floodlights.

(d) Each handheld tool shall be provided with a two-pole switch of the "dead-man-control" type that must be held closed by hand and will open when hand pressure is released.

(e) A machine designed to operate from both trolley wire and portable cable shall be provided with a transfer switch, or equivalent, which prevents energizing one from the other. Such a switch shall be designed to prevent electrical connection to the machine frame when the cable is energized.

(f) Belt conveyors shall be equipped with control switches to automatically stop the driving motor in the event the belt is stopped, or abnormally slowed down.

NOTE: Short transfer-type conveyors will be exempted from this requirement when attended

§ 18.49 Connection boxes on machines.

Connection boxes used to facilitate replacement of cables or machine components shall be explosion-proof. Portable-cable terminals on cable reels need not be in explosion-proof enclosures provided that connections are well made, adequately insulated, protected from damage by location, and securely clamped to prevent mechanical strain on the connections.

§ 18.50 Protection against external arcs and sparks.

Provision shall be made for maintaining the frames of all off-track machines and the enclosures of related detached components at safe voltages by using one or a combination of the following:

(a) A separate conductor(s) in the portable cable in addition to the power conductors by which the machine frame can be connected to an acceptable grounding medium, and a separate conductor in all cables connecting related components not on a common chassis. The cross-sectional area of the additional conductor(s) shall not be less than 50 percent of that of one power conductor unless a ground-fault tripping relay is used, in which case the minimum size may be No. 8 (AWG). Cables smaller than No. 6 (AWG) shall have an additional conductor(s) of the same size as one power conductor.

(b) A means of actuating a circuit-interrupting device, preferably at the outby end of the portable cable.

NOTE: The frame to ground potential shall not exceed 40 volts.

(c) A device(s) such as a diode(s) of adequate peak inverse voltage rating and current-carrying capacity to conduct possible fault current through the grounded power conductor. Diode installations shall include: (1) An overcurrent device in series with the diode, the contacts of which are in the machine's control circuit; and (2) a blocking diode in the control circuit to prevent operation of the machine with the polarity reversed.

§ 18.51 Electrical protection of circuits and equipment.

(a) An automatic circuit-interrupting device(s) shall be used to protect each ungrounded conductor of a branch circuit at the junction with the main circuit when the branch-circuit conductor(s) has a current carrying capacity less than 50 percent of the main circuit conductor(s), unless the protective device(s) in the main circuit will also provide adequate protection for the branch circuit. The setting of each device shall be specified. For headlight and control circuits, each conductor shall be protected by a fuse or equivalent. Any circuit that is entirely contained in an explosion-proof enclosure shall be exempt from these requirements.

(b) Each motor shall be protected by an automatic overcurrent device. One protective device will be acceptable when two motors of the same rating operate simultaneously and perform virtually the same duty.

(1) If the overcurrent-protective device in a direct-current circuit does not open both lines, particular attention shall be given to marking the polarity at the terminals or otherwise preventing the possibility of reversing connections which would result in changing the circuit interrupter to the grounded line.

(2) Three-phase alternating-current motors shall have an overcurrent-protective device in at least two phases such that actuation of a device in one phase will cause the opening of all three phases.

(c) Circuit-interrupting devices shall be so designed that they can be reset without opening the compartment in which they are enclosed.

(d) All magnetic circuit-interrupting devices shall be mounted in a manner to preclude the possibility of their closing by gravity.

§ 18.52 Renewal of fuses.

Enclosure covers that provide access to fuses, other than headlight, control-circuit, and handheld-tool fuses, shall be interlocked with a circuit-interrupting device. Fuses shall be inserted on the load side of the circuit interrupter.

Subpart C—Inspections and Tests

§ 18.60 Detailed inspection of components.

An inspection of each electrical component shall include the following:

(a) A detailed check of parts against the drawings submitted by the applicant to determine that: (1) The parts and drawings coincide; and (2) the minimum requirements stated in this part have been met with respect to materials, dimensions, configuration, workmanship, and adequacy of drawings and specifications.

(b) Exact measurement of joints, journal bearings, and other flame-arresting paths.

(c) Examination for unnecessary through holes.

(d) Examination for adequacy of lead-entrance design and construction.

(e) Examination for adequacy of electrical insulation and clearances between live parts and between live parts and the enclosure.

(f) Examination for weaknesses in welds and flaws in castings.

(g) Examination for distortion of enclosures before tests.

(h) Examination for adequacy of fastenings, including size, spacing, security, and possibility of bottoming.

§ 18.61 Final inspection of complete machine.

(a) A completely assembled new machine or a substantially modified design of a previously approved one shall be inspected by a qualified representative(s) of MSHA. When such inspection discloses any unsafe condition or any feature not in strict conformance with the requirements of this part it shall be corrected before an approval of the machine will be issued. A final inspection will be conducted at the site of manufacture, rebuilding, or other locations at the option of MSHA.

(b) Complete machines shall be inspected for:

(1) Compliance with the requirements of this part with respect to joints, lead entrances, and other pertinent features.

(2) Wiring between components, adequacy of mechanical protection for cables, adequacy of clamping of cables, positioning of cables, particularly with respect to proximity to hydraulic components.

(3) Adequacy of protection against damage to headlights, push buttons, and any other vulnerable component.

(4) Settings of overload- and short-circuit protective devices.

(5) Adequacy of means for connecting and protecting portable cable.

§ 18.62 Tests to determine explosion-proof characteristics.

(a) In testing for explosion-proof characteristics of an enclosure, it shall be filled and surrounded with various explosive mixtures of natural gas and air. The explosive mixture within the enclosure will be ignited electrically and the explosion pressure developed therefrom recorded. The point of ignition within the enclosure will be varied. Motor armatures and/or rotors will be stationary in some tests and revolving in others. Coal dust, produced by grinding coal from the Pittsburgh coal bed to a fineness of minus 200 mesh, will be added to the explosive gas-air mixtures in some tests. At MSHA's discretion dummies may be substituted for internal electrical components during some of the tests. Not less than 16 explosion tests shall be conducted; however, the nature of the enclosure and the results obtained during the tests will determine whether additional tests shall be made.

(b) Explosion tests of an enclosure shall not result in:

(1) Discharge of flame.

(2) Ignition of an explosive mixture surrounding the enclosure.

(3) Development of afterburning.

(4) Rupture of any part of the enclosure or any panel or divider within the enclosure.

(5) Permanent distortion of the enclosure exceeding 0.040 inch per linear foot.

(c) When a pressure exceeding 125 pounds per square inch (gage) is developed during explosion tests, MSHA reserves the right to reject an enclosure(s) unless (1) constructional changes are made that result in a reduction of pressure to 125 pounds per square inch (gage) or less, or (2) the enclosure withstands a dynamic pressure of twice the highest value recorded in the initial test.

§ 18.63 Tests of battery boxes.

Battery boxes will be tested at MSHA's discretion to determine the adequacy of ventilation, electrical clearances, insulation, and suitability for the intended service. Such tests will be conducted at the site of manufacture or assembly, or on MSHA's premises.

[33 FR 4660, Mar. 19, 1968; 33 FR 6345, Apr. 26, 1968]

§ 18.64 Tests for flame resistance of cables.

(a) *Size of test specimen.* Three specimens each 3 feet long with 5 inches of cable jacket and 2½ inches of conductor insulation removed from each conductor at both ends of each specimen.

(b) *Flame-test apparatus.* The principal parts of the apparatus within and/or appended to the 17-inch deep × 14½-inch high × 39-inch wide rectangular test gallery are:

(1) A source of electric current (either a.c. or d.c.) for loading the cable specimen with means for close regulation.

(2) A suitable ammeter to measure the electric current imposed on the cable specimen conductors.

(3) A suitable temperature measuring device to determine the conductor temperature.

(4) A rack for supporting the cable specimen. It shall have three (3) metal rods installed on the same level with spaces of 16 and 8 inches between rods from left to right. The rods shall be wrapped with asbestos tape to reduce the cooling effect. The height of the rack shall be sufficient to permit the tip of the inner cone of a Tirrell burner flame to touch the jacket of the cable specimen when the flame has been adjusted to proper height.

(5) An electric timer or stopwatch to measure the duration of the tests.

(6) A standard ⅜-inch Tirrell burner for igniting the cable specimen.

(7) A ventilated hood or canopy that is substantially free from external air currents on the specimen.

(c) *Mounting of test specimen.* The test specimen shall be placed on the rack and connected to the electric current source. It shall be centered on the two outside supporting rods with approximately one inch of jacket extending beyond each rod. The thermocouple of the temperature measuring device shall be held in intimate contact with the conductor under a flap of jacket and insulation 26 inches from the left end of the specimen. The flap shall be held tightly, after insertion of the thermocouple, by tying with wire.

(d) *Procedure for flame tests of cables.* (1) The specimen will be heated electrically until the conductor reaches a temperature of 400° F., using a current that is five times the conductor rating given in Tables 1, 2, and 3 in Appendix I.

(2) When the conductor has reached a temperature of 400° F., the flame of a Tirrell gas burner, adjusted to give an overall free flame height of 5 inches and a 3-inch inner cone with natural gas, will be applied directly beneath the specimen at a point 14 inches from its left end.

(3) After subjecting the specimen to external flame for 1 minute, the heating current and gas flame will be cut off simultaneously.

(e) *Test requirements.* The specimen will be considered as having failed the test if the length of the burned area exceeds 6 inches or if burning continues longer than 4 minutes after the gas flame has been cut off. Three specimens of cable will be subjected to the flame-resistance test. If two of the three specimens meet the test requirements, the cable will be accepted for listing by MSHA as "flame resistant".

(f) *Acceptance marking.* Accepted cables shall be suitably marked with an identifying number assigned by MSHA. Portable and remote-control cables shall have the marketing impressed in the jacket or as raised letters and figures on an impressed background at intervals not exceeding 12 feet. Other accepted cables shall be marked at intervals not exceeding 3 feet in the same manner or have durable marking printed on the surface of the jacket.

§ 18.65 Flame test of conveyor belting and hose.

(a) *Size of test specimen.* (1) Conveyor belting—four specimens each 6 inches long by ½-inch wide by belt thickness, two cut parallel to the warp and two parallel to the weft.

(2) Hose—four specimens each 6 inches long by ½-inch wide by thickness of the hose.

(b) *Flame-test apparatus.* The principal parts of the apparatus within and/or appended to a 21-inch cubical test gallery are:

(1) A support stand with a ring clamp and wire gauze.

(2) A Pittsburgh-Universal Bunsen-type burner (inside diameter of burner tube 11 mm.), or equivalent, mounted in a burner placement guide in such a manner that the burner may be placed beneath the test specimen, or pulled away from it by an external knob on the front panel of the test gallery.

(3) A variable-speed electric fan and an ASME flow nozzle (16-8½ inches reduction) to attain constant air velocities at any speed between 50-500 feet a minute.

(4) An electric timer or stopwatch to measure the duration of the tests.

(5) A mirror mounted inside the test gallery to permit a rear view of the test specimen through the viewing door.

(c) *Mounting of test specimen.* The specimen shall be clamped in a support with its free end centered 1 inch above the burner top. The longitudinal axis shall be horizontal and the transverse axis inclined at 45° to the horizontal. Under the test specimen shall be clamped a piece of 20-mesh iron-wire gauze, 5 inches square, in a horizontal position ¼-inch below the pulley cover edge of the specimen and with about ½-inch of the specimen extending beyond the edge of the gauze.

(d) *Procedure for flame tests.* (1) The Bunsen burner, retracted from the test position, shall be adjusted to give a blue flame 3 inches in height with natural gas.

(2) The observation door of the gallery shall be closed for the entire test.

(3) The burner flame shall be applied to the free end of the specimen for 1 minute in still air.

(4) At the end of 1 minute the burner flame shall be removed, the ventilating fan turned on to give an air current having a velocity of 300 feet per minute, and the duration of flame measured.

(5) After the test specimen ceases to flame, it shall remain in the air current for at least 3 minutes to determine the presence and duration of afterglow. If a glowing specimen exhibits flame within 3 minutes the duration of flame shall be added to the duration of flame obtained according to paragraph (d) (4) of this section.

(e) *Test requirements.* The tests of the four specimens cut from any sample shall not result in either duration of flame exceeding an average of 1 minute after removal of the applied flame or afterglow exceeding an average of 3 minutes duration.

(f) *Acceptance markings.* (1) Conveyor belting—conveyor belts accepted by MSHA as flame-resistant (fire-resistant) shall be marked as follows: Metal stencils furnished by the manufacturer shall be used during the vulcanizing process to produce letters depressed into the conveyor belt with the words "Fire-Resistant, USMSHA No. ——." This number will be assigned to the manufacturer after the sample has passed the tests. The letters and numbers shall be at least ½ inch high. The acceptance markings shall be placed approximately 1 inch from the edge of the carrying (top) cover of the conveyor belt and spaced at intervals not exceeding 30 feet for the entire length of the conveyor belt. The markings shall be so placed that they are alternately at opposite edges of the belt. Where cover thickness does not permit markings in accordance with the foregoing, other permanent markings may be accepted.

(2) Hose—hose conduit accepted by MSHA as flame-resistant shall be marked as follows: Impressed letters, raised letters on depressed background, or printed letters with the words "Flame-Resistant, USMSHA No. ——" at intervals not exceeding 3 feet. This number will be assigned to the manufacturer after the sample has passed the tests. The letters and numbers shall be at least ¼-inch high.

[33 FR 4660, Mar. 19, 1968, as amended at 43 FR 12314, Mar. 24, 1978]

§ 18.66 Tests of windows and lenses.

(a) *Impact tests.* A 4-pound cylindrical weight with a 1-inch-diameter hemispherical striking surface shall be dropped (free fall) to strike the window or lens in its mounting, or the equivalent thereof, at or near the center. Three of four samples shall withstand without breakage the impact according to the following table:

Lens diameter, (D), inches	Height of fall, inches
$D<4$	6
$4\leq D<5$	9
$5\leq D<6$	15
$6\leq D$	24

Windows or lenses of smaller diameter than 1 inch may be tested by alternate methods at the discretion of MSHA.

(b) *Thermal-shock tests.* Four samples of the window or lens will be heated in an oven for 15 minutes to a temperature of 150° C. (302° F.) and immediately upon withdrawal of the samples from the oven they will be immersed in water having a temperature between 15° C. (59° F) and 20° C. (68° F.). Three of the four samples shall show no defect or breakage from this thermal-shock test.

§ 18.67 Static-pressure tests.

Static-pressure tests shall be conducted by the applicant on each enclosure of a specific design when MSHA determines that visual inspection will not reveal defects in castings or in single-seam welds. Such test procedure shall be submitted to MSHA for approval and the specifications on file with MSHA shall include a statement assuring that such tests will be conducted. The static pressure to be applied shall be 150 pounds per square inch (gage) or one and one-half times the maximum pressure recorded in MSHA's explosion tests, whichever is greater.

§ 18.68 Tests for intrinsic safety.

(a) General:

(1) Tests for intrinsic safety will be conducted under the general concepts of "intrinsically safe" as defined in Subpart A of this part. Further tests or requirements may be added at any time if features of construction or use or both indicate them to be necessary. Some tests included in these requirements may be omitted on the basis of previous experience.

(2) Intrinsically safe circuits and/or components will be subjected to tests consisting of making and breaking the intrinsically safe circuit under conditions judged to simulate the most hazardous probable faults or malfunctions. Tests will be made in the most easily ignitable mixture of methane or natural gas and air. The method of making and breaking the circuit may be varied to meet a particular condition.

(3) Those components which affect intrinsic safety must meet the following requirements:

(i) Current limiting components shall consist of two equivalent devices each of which singly will provide intrinsic safety. They shall not be operated at more than 50 percent of their ratings.

(ii) Components of reliable construction shall be used and they shall be so mounted as to provide protection against shock and vibration in normal use.

(iii) Semiconductors shall be amply sized. Rectifiers and transistors shall be operated at not more than two-thirds of their rated current and permissible peak inverse voltage. Zener diodes shall be operated at not more than one-half of their rated current and shall short under abnormal conditions.

(iv) Electrolytic capacitors shall be operated at not more than two-thirds of their rated voltage. They shall be designed to withstand a test voltage of 1,500 volts.

(4) Intrinsically safe circuits shall be so designed that after failure of a single component, and subsequent failures resulting from this first failure, the circuit will remain intrinsically safe.

(5) The circuit will be considered as intrinsically safe if in the course of testing no ignitions occur.

(b) Complete intrinsically safe equipment powered by low energy batteries:

(1) Short-circuit tests shall be conducted on batteries at normal operating temperature. Tests may be made on batteries at elevated temperature if such tests are deemed necessary.

(2) Resistance devices for limiting short-circuit current shall be an integral part of the battery, or installed as close to the battery terminal as practicable.

(3) Transistors of battery-operated equipment may be subjected to thermal "run-away" tests to determine that they will not ignite an explosive atmosphere.

(4) A minimum of 1,000 make-break sparks will be produced in each test for direct current circuits with consideration given to reversed polarity.

(5) Tests on batteries shall include series and/or parallel combinations of twice the normal battery complement, and the effect of capacitance and inductance, added to that normally present in the circuit.

(6) No ignition shall occur when approximately ½-inch of a single wire strand representative of the wire used in the equipment or device is shorted across the intrinsically safe circuit.

(7) Consideration shall be given to insure against accidental reversal of polarity.

(c) Line-powered equipment and devices:

(1) Line-powered equipment shall meet all applicable provisions specified for battery-powered equipment.

(2) Nonintrinsically safe components supplying power for intrinsically safe circuits shall be housed in explosion-proof enclosures and be provided with energy limiting components in the enclosure.

(3) Wiring for nonintrinsically safe circuits shall not be intermingled with wiring for intrinsically safe circuits.

(4) Transformers that supply power for intrinsically safe circuits shall have the primary and secondary windings physically separated. They shall be designed to withstand a test voltage of 1,500 volts when rated 125 volts or less and 2,500 volts when rated more than 125 volts.

(5) The line voltage shall be increased to 120 percent of nominal rated voltage to cover power line voltage variations.

(6) In investigations of alternating current circuits a minimum of 5,000 make-break sparks will be produced in each test.

(d) The design of intrinsically safe circuits shall preclude extraneous voltages caused by insufficient isolation or inductive coupling. The investigation shall determine the effect of ground faults where applicable.

(e) Identification markings: Circuits and components of intrinsically safe equipment and devices shall be adequately identified by marking or labeling. Battery-powered equipment shall be marked to indicate the manufacturer, type designation, ratings, and size of batteries used.

§ 18.69 Adequacy tests.

MSHA reserves the right to conduct appropriate test(s) to verify the adequacy of equipment for its intended service.

Subpart D—Machines Assembled With Certified or Explosion-Proof Components, Field Modifications of Approved Machines, and Permits To Use Experimental Equipment

§ 18.80 Approval of machines assembled with certified or explosion-proof components.

(a) A machine may be a new assembly, or a machine rebuilt to perform a service that is different from the original function, or a machine converted from nonpermissible to permissible status, or a machine converted from direct- to alternating-current power or vice versa. Properly identified components that have been investigated and accepted for application on approved machines will be accepted in lieu of certified components.

(b) A single layout drawing (see Figure 1 in Appendix II) or photographs will be acceptable to identify a machine that was assembled with certified or explosion-proof components. The following information shall be furnished:

(1) Overall dimensions.

(2) Wiring diagram.

(3) List of all components (see Figure 2 in Appendix II) identifying each according to its certification number or the approval number of the machine of which the component was a part.

(4) Specifications for:

(i) Overcurrent protection of motors.

(ii) All wiring between components, including mechanical protection such as hose conduits and clamps.

(iii) Portable cable, including the type, length, outside diameter, and number and size of conductors.

(iv) Insulated strain clamp for machine end of portable cable.

(v) Short-circuit protection to be provided at outby end of portable cable.

(c) MSHA reserves the right to inspect and to retest any component(s) that had been in previous service, as it deems appropriate.

(d) Fees for testing under this subpart shall be consistent with those stated in § 18.7.

(e) When MSHA has determined that all applicable requirements of this part have been met, the applicant will be authorized to attach an approval plate to each machine that is built in strict accordance with the drawings and specifications filed with MSHA and listed with MSHA's formal approval. A design of the approval plate will accompany the notification of approval. (Refer to §§ 18.10 and 18.11.)

(f) Approvals are issued only by Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26049.

[33 FR 4660, Mar. 19, 1968, as amended at 43 FR 12314, Mar. 24, 1978]

§ 18.81 Field modification of approved (permissible) equipment; application for approval of modification; approval of plans for modification before modification.

(a) An owner of approved (permissible) equipment who desires to make modifications in such equipment shall apply in writing to make such modifications. The application, together with the plans of modifications, shall be filed with Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26049.

(b) Proposed modifications shall conform with the applicable requirements of Subpart B of this part, and shall not substantially alter the basic functional design that was originally approved for the equipment.

(c) Upon receipt of the application for modification, and after such examination and investigation as may be deemed necessary by MSHA, MSHA will notify the owner and the District office of the mine workers' organization having jurisdiction at the mine where such equipment is to be operated stating the modifications which are proposed to be made and MSHA's action thereon.

[33 FR 4660, Mar. 19, 1968, as amended at 43 FR 12314, Mar. 24, 1978]

§ 18.82 Permit to use experimental electric face equipment in a gassy mine or tunnel.

(a) *Application for permit.* An application for a permit to use experimental electric face equipment in a gassy mine or tunnel will be considered only when submitted by the user of the equipment. The user shall submit a written application to the Assistant Secretary of Labor for Mine Safety and Health, 4015 Wilson Boulevard, Arlington, Va. 22203, and send a copy to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26049.

(b) *Fees.* The applicable fees for work to be done according to this subpart shall coincide with the fees stated in § 18.7.

(c) *Requirements*—(1) *Constructional.* (i) Experimental equipment shall be so constructed that it will not constitute a fire or explosion hazard.

(ii) Enclosures designed as explosion-proof, unless already certified, or components of previously approved (permissible) machines, shall be submitted to MSHA for inspection and test and shall meet the applicable design requirements of Subpart B of this part. Components designed as intrinsically safe also shall be submitted to MSHA for investigation.

(iii) MSHA may, at its discretion, waive the requirements for detailed drawings of component parts, inspections, and tests provided satisfactory evidence is submitted that an enclosure has been certified, or otherwise accepted by a reputable testing agency whose standards are substantially equivalent to those set forth in Subpart B of this part.

(2) *Specifications.* The specifications for experimental equipment shall include a layout drawing (see Figure 1 in Appendix II) or photograph(s) with the components, including overcurrent-protective device(s) with setting(s) identified thereon or separately; a wiring diagram; and descriptive material necessary to insure safe operation of the equipment. Drawings already filed with MSHA need not be duplicated by the applicant, but shall be properly identified.

(d) *Final inspection.* Unless equipment is delivered to MSHA for investigation, the applicant shall notify Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26049, when and where the experimental equipment will be ready for inspection by a representative of MSHA before installing it on a trial basis. Such inspection shall be completed before a permit will be issued.

(e) *Issuance of permit.* When the inspection discloses full compliance with the applicable requirements of this subpart, the Assistant Secretary will issue a permit sanctioning the operation of a single unit in a gassy mine or tunnel, as designated in the application. If the applicant is not the assembler of the equipment, a copy of the permit also may be sent to the assembler.

(f) *Duration of permit.* A permit will be effective for a period of 6 months. For a valid reason, to be stated in a written application, the Administrator of MSHA may grant an extension of a permit for an additional period, not exceeding 6 months. Further extension will be granted only where, after investigation, the Assistant Secretary finds that for reasons beyond the control of the user, it has not been possible to complete the experiment within the period covered by the extended permit.

(g) *Permit label.* With the notification granting a permit, the applicant will receive a photographic copy of a permit label bearing the following:

(1) Emblem of the Mine Safety and Health Administration.

(2) Permit number.

(3) Expiration date of the permit.

(4) Name of machine.

(5) Name of the user and mine or tunnel.

The applicant shall attach the photographic copy of the permit label, or replica thereof, to the experimental equipment. If a photograph is used, a clear plastic covering shall be provided for it.

(h) *Withdrawal of permit.* The Assistant Secretary may rescind, for cause, any permit granted under this subpart.

[33 FR 4660, Mar. 19, 1968, as amended at 43 FR 12314, Mar. 24, 1978]

APPENDIX I

LIST OF TABLES

Table No.	Title
1	Portable power cable ampacities—600 volts.
2	Portable cord ampacities—600 volts.
3	Portable power cable ampacities—601 to 5,000 volts.
4	Nominal diameter of round cables with tolerances in inches—600 volts.
5	Nominal dimension of flat cables with tolerances in inches—600 volts.
6	Nominal diameter of heavy jacketed cords with tolerances in inches—600 volts.

APPENDIX I—Continued

LIST OF TABLES

Table No.	Title
7	Nominal diameter of three-conductor portable power cables with tolerances in inches—601 to 5,000 volts.
8	Fuse ratings or instantaneous settings of circuit breakers for short-circuit protection of portable cables.
9	Specifications for portable cables longer than 500 feet.

TABLE 1—PORTABLE POWER CABLE AMPACITIES—600 VOLTS (AMPERES PER CONDUCTOR BASED ON 60° C. COPPER TEMPERATURE—40° C. AMBIENT)

Conductor size—AWG or MCM	Single conductor	2-conductor, round or flat	3-conductor, round or flat	4-conductor	5-conductor	6-conductor
8	45	40	35	30	25	20
6	60	50	50	40	35	30
4	85	70	65	55	45	35
3	95	80	75	65	55	45
2	110	95	90	75	65	55
1	130	110	100	85	75	65
1/0	150	130	120	100	90	80
2/0	175	150	135	115	105	95
3/0	205	175	155	130	120	110
4/0	235	200	180	150	140	130
250	275	220	200	160		
300	305	240	220	175		
350	345	240	235	190		
400	375	280	250	200		
450	400	300	270	215		
500	425	320	290	230		

TABLE 2—PORTABLE CORD AMPACITIES—600 VOLTS (AMPERES PER CONDUCTOR BASED ON 60° C. COPPER TEMPERATURE—40° C. AMBIENT)

Conductor size—AWG	1–3 conductor	4–6 conductor	7–9 conductor
14	15	12	8
12	20	16	11
10	25	20	14

TABLE 3—PORTABLE POWER CABLE AMPACITIES—601 TO 5,000 VOLTS (AMPERES PER CONDUCTOR BASED ON 75° C. COPPER TEMPERATURE—40° C. AMBIENT)

Conductor size—AWG or MCM	3-conductor types G-GC and SHC-GC 2,000 volts	3-conductor type SHD-GC 2,001-5,000 volts
6	65	65
4	85	85
3	100	100
2	115	115
1	130	130
1/0	145	145

TABLE 3—PORTABLE POWER CABLE AMPACITIES—-601 TO 5,000 VOLTS (AMPERES PER CONDUCTOR BASED ON 75° C. COPPER TEMPERATURE—40° C. AMBIENT)—Continued

Conductor size—AWG or MCM	3-conductor types G-GC and SHC-GC 2,000 volts	3-conductor type SHD-GC 2,001-5,000 volts
2/0	170	170
3/0	195	195
4/0	220	220
250	245	245
300	275	275
350	305	305

TABLE 4—NOMINAL DIAMETERS OF ROUND CABLES WITH TOLERANCES IN INCHES—600 VOLTS

Conductor size—AWG or MCM	Single conductor	2-conductor			3-conductor			4-conductor—Types W & G	5-conductor—Types W & G	6-conductor	
		Types W & G twisted	Type PG, 2 power	Type PCG, 3 power, ground	Types W & G	Type PG, 3 power, ground	Type PCG, 3 power, 2 control, ground			Type w	Tolerance
8	0.44	0.81	0.84	0.94	0.91	0.93	1.03	0.99	1.07	1.18	±0.03
6	.51	.93	.93	.98	1.01	1.03	1.18	1.10	1.21	1.31	±.03
4	.57	1.08	1.08	1.10	1.17	1.20	1.29	1.27	1.40	1.52	±.03
3	.63	1.17	1.17	1.20	1.24	1.27	1.31	1.34	1.48	1.61	±.03
2	.66	1.27	1.27	1.29	1.34	1.34	1.39	1.48	1.61	1.75	±.03
1	.74	1.44	1.44	1.44	1.51	1.52	1.52	1.68	1.88	2.05	±.03
1/0	.77	1.52	1.52	1.52	1.65	1.68	1.68	1.79	1.96	2.13	±.04
2/0	.82	1.65	1.65	1.65	1.75	1.79	1.79	1.93	2.13	2.32	±.04
3/0	.87	1.77	1.77	1.77	1.89	1.93	1.93	2.07	2.26	2.49	±.05
4/0	.93	1.92	1.92	1.92	2.04	2.13	2.13	2.26	2.46	2.71	±.05
250	1.03	2.16	2.16	2.16	2.39	2.39	2.39	2.66			±.06
300	1.09	2.32			2.56			2.84			±.06
350	1.15	2.43			2.68			2.98			±.06
400	1.20	2.57			2.82			3.14			±.06
450	1.26	2.67			2.94			3.26			±.06
500	1.31	2.76			3.03			3.40			±.06

TABLE 5—NOMINAL DIMENSIONS OF FLAT CABLES WITH TOLERANCES IN INCHES—600 VOLTS

Conductor size—AWG	2-conductor								3-conductor—Type G			
	Type W				Type G				Major		Minor	
	Major		Minor		Major		Minor					
	O.D.	Tolerance	O.D.	Tolerance	O.D.	Tolerance	O.D.	Tolerance	O.D.	Tolerance	O.D.	Tolerance
8	0.84	±0.04	0.51	±0.03								
6	.93	±.04	.56	±.03	1.02	±.04	0.56	±.03	1.65	±0.06	0.67	±0.05
4	1.05	±.04	.61	±.03	1.15	±.04	.61	±.03	1.85	±.06	.75	±.05
3	1.14	±.04	.68	±.03	1.26	±.04	.68	±.03	1.99	±.06	.77	±.05
2	1.24	±.04	.73	±.03	1.35	±.04	.73	±.06	2.10	±.06	.81	±.05
1	1.40	±.04	.81	±.03	1.55	±.04	.81	±.03	2.43	±.06	.97	±.05
1/0	1.51	±.04	.93	±.03	1.67	±.04	.93	±.03				
2/0	1.63	±.04	.99	±.03	1.85	±.04	.99	±.03				
3/0	1.77	±.04	1.03	±.03	2.00	±.04	1.03	±.03				
4/0	1.89	±.04	1.10	±.03	2.10	±.04	1.10	±.03				

TABLE 6—NOMINAL DIAMETERS OF HEAVY JACKETED CORDS WITH TOLERANCES IN INCHES—600 VOLTS

Conductor size—AWG	2-conductor		3-conductor		4-conductor		5-conductor		6-conductor		7-conductor	
	Diameter	Tolerance	Diameter	Tolerance	Diameter	Tolerance	Diameter	Tolerance	Diameter	Tolerance	Diameter	Tolerance
14	0.64	±0.02	0.67	±0.02	0.71	±0.02	0.78	±0.03	0.83	±0.03	0.89	±0.03
12	68	±.02	72	±.03	.76	±.03	.83	±.03	.89	±.03	.98	±.03
10	73	±.03	.80	±.03	.84	±.03	.90	±.03	1.00	±.03	1.07	±.03

TABLE 7—NOMINAL DIAMETERS OF THREE-CONDUCTOR PORTABLE POWER CABLES WITH TOLERANCES IN INCHES—601 to 5,000 VOLTS

Conductor size—AWG or MCM	Type G-GC (nonshielded) 2,000 volts		Type SHC-GC (shielded overall) 2,000 volts		Type SHD-GC (individually shielded power conductors) 2,001-3,000 volts		Type SHD-GC (individually shielded power conductors) 3,001-5,000 volts	
	Diameter	Tolerance	Diameter	Tolerance	Diameter	Tolerance	Diameter	Tolerance
6	1.25	+0.10, −0.06	1.39	+0.11, −0.07	1.62	+0.13, −0.08	1.78	+0.14, −0.09
4	1.40	+.11, −.07	1.55	+.12, −.08	1.77	+.14, −.09	1.90	+.15, −.10
3	1.48	+.12, −.07	1.62	+.13, −.08	1.84	+.15, −.09	1.98	+.16, −.10
2	1.55	+.12, −.08	1.71	+.14, −.09	1.92	+.15, −.10	2.09	+.17, −.11
1	1.74	+.14, −.09	1.89	+.15, −.09	2.04	+.16, −.10	2.18	+.17, −.11
1/0	1.84	+.15, −.09	2.02	+.16, −.10	2.18	+.17, −.11	2.34	+.19, −.12
2/0	1.99	+.16, −.10	2.16	+.17, −.11	2.29	+.18, −.12	2.46	+.20, −.12
3/0	2.12	+.17, −.11	2.30	+.18, −.11	2.45	+.20, −.12	2.62	+.21, −.13
4/0	2.30	+.18, −.12	2.48	+.20, −.12	2.62	+.21, −.13	2.76	+.22, −.14
250	2.46	+.20, −.12	2.70	+.22, −.13				
300	2.63	+.21, −.13	2.84	+.23, −.14				
350	2.75	+.22, −.14	2.97	+.24, −.15				

TABLE 8—FUSE RATINGS OR INSTANTANEOUS SETTING OF CIRCUIT BREAKERS FOR SHORT-CIRCUIT PROTECTION OF PORTABLE CABLES AND CORDS

Conductor size—AWG or MCM	Ohms/1,000 ft. at 25° C.	Maximum allowable fuse rating (amperes)	Maximum allowable circuit breaker instantaneous setting (amperes) [1]
14	2.62	20	50
12	1.65	30	75
10	1.04	40	150
8	654	80	200
6	410	100	300
4	259	200	500
3	205	250	600
2	162	300	800
1	129	375	1,000
1/0	102	500	1,250
2/0	081		1,500
3/0	.064		2,000
4/0	.051		2,500
250	.043		2,500
300	.036		2,500
350	.031		2,500
400	.027		2,500
450	.024		2,500
500	.022		2,500

[1] Higher circuit-breaker settings may be permitted for special applications when justified.

TABLE 9—SPECIFICATIONS FOR PORTABLE CABLES LONGER THAN 500 FEET [1]

Conductor size—AWG or MCM	Max allowable length (feet)	Normal ampacity at 60° C. copper temperature (40° C ambient)	Resistance at 60° C. copper temperature (ohms)
6	550	50	0.512
4	600	70	.353
3	650	80	.302
2	700	95	.258
1	750	110	.220
1/0	800	130	.185
2/0	850	150	.157
3/0	900	175	.130
4/0	1,000	200	.116
250	1,000	220	.098
300	1,000	240	.082
350	1,000	260	.070
400	1,000	280	.061
450	1,000	300	.054
500	1,000	320	.050

[1] Fuses shall not be used for short-circuit protection of these cables. Circuit breakers shall be used with the instantaneous trip settings not to exceed the values given in Table 8.

[33 FR 4660, Mar. 19, 1968; 33 FR 6345, Apr. 26, 1968, as amended at 42 FR 8373, Feb. 10, 1977]

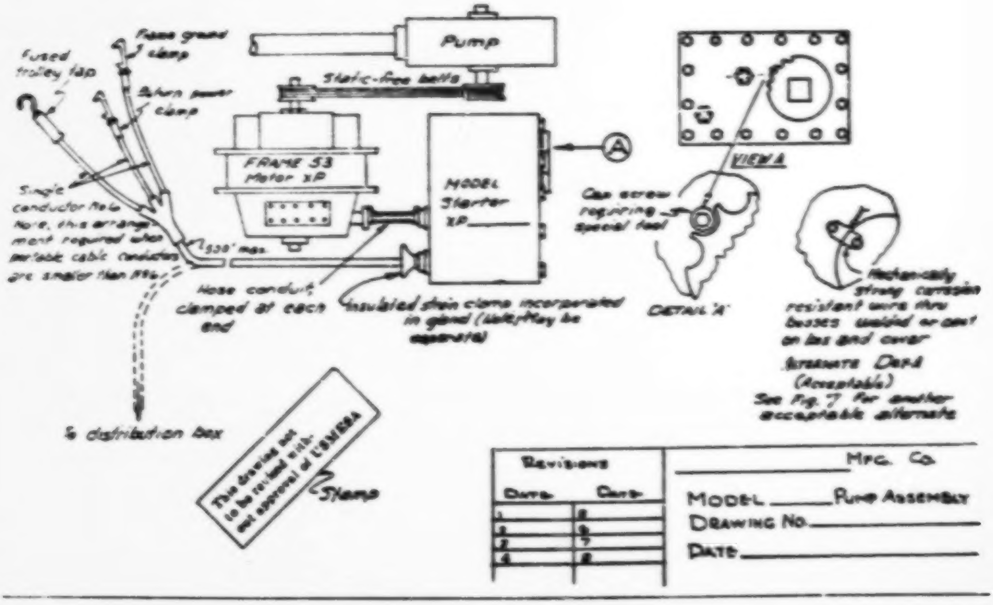
APPENDIX II

LIST OF FIGURES

Figure No.	Title
1	Typical layout drawing of a machine.
2	Sample bill of material (to accompany layout drawing shown on figure 1).
3	Material to be included with the operating instructions on or with the wiring diagram submitted to each customer.
4	Sample factory inspection form.
5	Typical plane joint.
6	Typical combination joint.
7	Typical threaded joint.
8	Typical threaded straight stuffing box and packing gland lead entrance with provision for hose conduit.
9	Typical slip-fit straight-type and angle-type stuffing box and packing gland lead entrance.
10	Typical slip-fit angle-type stuffing box and packing gland lead entrance and typical plug for spare lead entrance hole.

Figure 1

TYPICAL LAYOUT DRAWING OF A MACHINE


Fused trolley tap
Power ground clamp
Return power clamp
Pump
Static-free belts
FRAME 53
Motor XP
MODEL
Starter
XP
Ⓐ
Single conductor leads
Note, this arrangement required when portable cable conductors are smaller than #6
530' max.
Hose conduit clamped at each end
Insulated strain clamp incorporated in gland (Note) May be separate
to distribution box
This drawing not to be revised without approval of USBM
Stamp
VIEW A
Cap screw requiring special tool
DETAIL 'A'
Mechanically strong corrosion resistant wire thru bosses welded or cast on box and cover
ALTERNATE DET-A (Acceptable)
See Fig. 7 for another acceptable alternate
Revisions
Date
Date
1
2
3
4
5
6
7
8
Mfg. Co.
MODEL
Pump Assembly
DRAWING NO.
DATE

BEST DOCUMENT AVAILABLE

FIGURE 2—SAMPLE BILL OF MATERIAL

B. of M. No. ————
Date ——————

Revision
Date
1. ——————
2. ——————
3. ——————
4. ——————
5. ——————

Bill of Material (Electrical)

——————————————
(Manufacturing Company)
Model: ——————————
(Unit Name)
Approval 2G- ——————————
Motor: ——————————
(Manufacturing Company)
Frame ——————————
——— Hp., ——— Volts, ——— Ph.,
——— Cy., ——— R.P.M.
X/P————————(Date).
——————(Date) Extension.
Starter: ——————————
(Manufacturing Company)
Model ——————————
————Hp., ————Volts.
X/P ——————————
(Date)
—————— Extension.
(Date)
Cable—Motor to Starter:
Cond. No. ———, ———"
O.D., ———' Long
Hose—Motor to Starter Cable:
———" I.D., ———" O.D., ——— ' Long
Portable (Trailing) Cable—
Type: ——————————
Cond. No. ———, ———"
O.D., ———' Long
Hose—for Portable Cable:
———" I.D., ———" O.D., ———' Long
Hose Clamps—
2 for Motor-Starter Hose conduit ———" D
1 for Portable Cable Hose conduit ——" D*

*Only when short length of hose is used.

Trolley Tap—

——————————————
(Manufacturing Company)
Model ———————————— with
————ampere fuse.
Rail Clamps, 2.
1 Ground Clamp, Cat. No. ———

——————————————
(Manufacturing Company)
1 Return Power Conductor, Cat. No. ———

——————————————
(Manufacturing Company)
or—as Optional
Plug on outby end of potable cable for insertion into receptacle on distribution box or equivalent with short-circuit protective device set at ——— amperes.
Static-free Belt
Model
Style
Catalog No. ———.

——————————————
(Manufacturing Company)
Guard for Belt—
Material ——————————————
Overall Dimensions ———" Long × ———" Wide ×———" High

NOTE: The foregoing is intended as a guide. Additional electrical components used shall be completely identified.

FIGURE 3—MATERIAL TO BE INCLUDED WITH THE OPERATING INSTRUCTIONS—ON OR WITH THE WIRING DIAGRAM SUBMITTED TO EACH CUSTOMER

(Sometimes referred to as "Caution Statement")

CAUTION

To retain "permissibility" of this equipment the following conditions shall be satisfied:

1. *General safety.* Frequent inspection shall be made. All electrical parts, including the portable cable and wiring, shall be kept in a safe condition. There shall be no openings into the casings of the electrical parts. A permissible distribution box shall be used for connection to the power circuit unless connection is made in fresh intake air. To maintain the overload protection on direct-current machines, the ungrounded conductor of the portable cable shall be connected to the proper terminal. The machine frame shall be effectively grounded. The power wires shall not be used for grounding except in conjunction with diode(s) or equivalent. The operating voltage should match the voltage rating of the motor(s).
2. *Servicing.* Explosion-proof enclosures shall be restored to the state of original safety with respect to all flame arresting paths, lead entrances, etc., following disassembly for repair or rebuilding, whether by the owner or an independent shop.
3. *Fastenings.* All bolts, nuts, screws, and other means of fastening, and also threaded covers, shall be in place, properly tightened and secured.
4. *Renewals and repairs.* Inspections, repairs, or renewals of electrical parts shall not be made unless the portable cable is disconnected from the circuit furnishing power, and the cable shall not be connected again until all parts are properly reassembled. Special care shall be taken in making renewals or repairs. Leave no parts off. Use replacement parts exactly like those furnished by the manufacturer. When any lead

entrance is disturbed, the original leads or exact duplicates thereof shall be used and stuffing boxes shall be repacked in the approved manner.

5. *Cable requirements.* A flame-resistant portable cable bearing a MSHA assigned identification number, adequately protected by an automatic circuit-interrupting device shall be used. Special care shall be taken in handling the cable to guard against mechanical injury and wear. Splices in portable cables shall be made in a workmanlike manner, mechanically strong, and well insulated. Not more than five temporary splices are permitted in a portable cable regardless of length. Connections and wiring to the outby end of the cable shall be in accordance with recognized standards of safety.

FIGURE 4—SAMPLE FACTORY INSPECTION FORM

Date ————

Inspector ——————

MACHINE

Designation: ————————————

Type: ———— Serial No. ——————

MOTOR

Manufacturer: ——————————

Serial No.: ——— Type: ——————

Frame: ——————————————

Hp.—— F.L. Speed:—— Volts:—— Amps.—

Winding: ——— X/P No. ——— (or parts list designation).

STARTER

Manufacturer: ——————————

Serial No. ——— Type: ——————

Hp. ——— Volts: ——— X/P No. ——— (or parts list designation).

Short-circuit protection ——— amps.

Overload-current protection ——— amps.

PORTABLE CABLE

Manufacturer: ——————————

Type: ———— Conductors: —————

Length: ——— O.D. ——— MSHA No. ———

Is all wiring around machine adequately protected from mechanical damage?

By hose conduit————, Troughs————

Metal tubing ————, Other —————

By removal of all sharp corners or edges? —

Is wiring separated from hydraulic components? ——————————————

Is an adequate insulated strain clamp provided for the portable cable? —————

Are all packing glands properly packed so that ⅛-inch clearance remains between packing nut and stuffing box? —————

Are lockwashers (or equivalent) provided for all explosion-proof enclosure fastenings? ——————————————

Are all plane joints securely fastened so that an 0.005-inch feeler gage cannot be inserted? ——————————

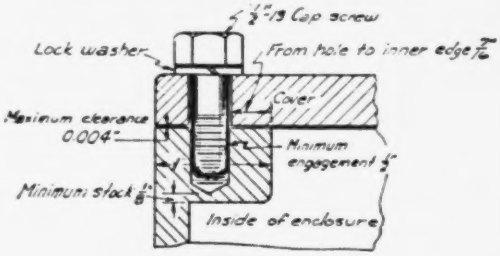
Are all threaded covers secured? —————

How? ——————————————

Are all electrical connections secure ——— and properly insulated where necessary? —

NOTE: Add appropriate material for each explosion-proof enclosure when more than a motor and starter are on a machine.

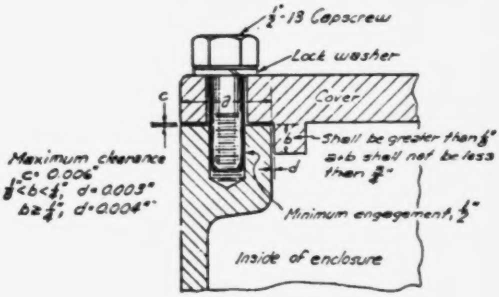
All dimensions apply to enclosures larger than 124 cubic inches in volume (when empty). For smaller enclosures refer to 18.31 (a)(6)


½″-13 Cap screw
Lock washer
From hole to inner edge 7/16″
Cover
Maximum clearance 0.004″
Minimum engagement ½″
Minimum stock ⅛″
Inside of enclosure

TYPICAL PLANE JOINT

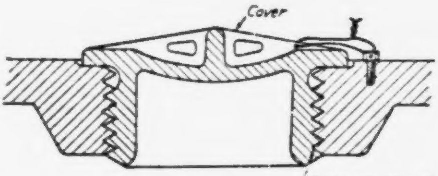
Figure 5

All dimensions apply to enclosures larger than 124 cubic inches in volume (when empty). For smaller enclosures refer to 18.31 (a) (6)


½″-13 Capscrew
Lock washer
Cover
a
c
b
Shall be greater than ⅛″
a+b shall not be less than ⅜″
d
Maximum clearance
c = 0.006″
⅛″<b<¼″, d=0.003″
b≥¼″, d=0.004″
Minimum engagement, ½″
Inside of enclosure

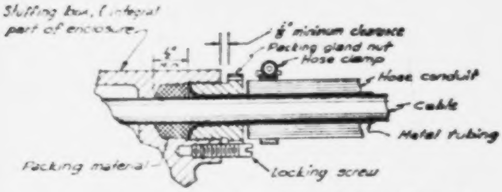
TYPICAL COMBINATION JOINT

Figure 6


Cover
Total developed length to conform to 18.31 (a)(6)—Class 1 fit

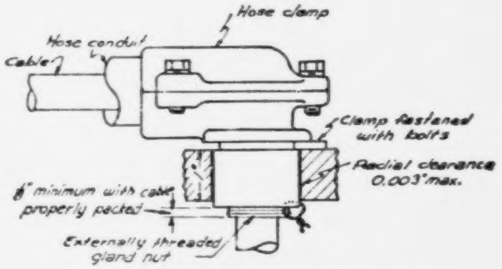
THREADED JOINT

Figure 7

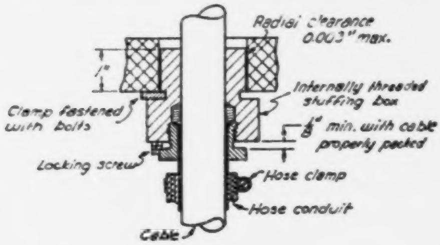

Stuffing box, (integral part of enclosure
⅛" minimum clearance
Packing gland nut
Hose clamp
Hose conduit
Cable
Metal tubing
Packing material
Locking screw

TYPICAL THREADED STRAIGHT STUFFING BOX AND PACKING GLAND LEAD ENTRANCE WITH PROVISION FOR HOSE CONDUIT

Figure 8.

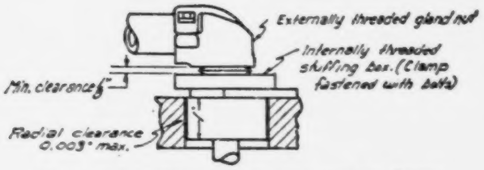

Hose clamp
Hose conduit
Cable
Clamp fastened with bolts
Radial clearance 0.003" max.
⅛" minimum with cable properly packed
Externally threaded gland nut

TYPICAL SLIP-FIT ANGLE TYPE STUFFING BOX PACKING GLAND LEAD ENTRANCE WITH HOSE CLAMP


Radial clearance 0.003" max.
1"
Internally threaded stuffing box
Clamp fastened with bolts
⅛" min. with cable properly packed
Locking screw
Hose clamp
Hose conduit
Cable

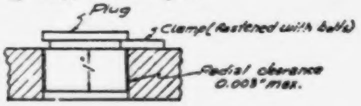
TYPICAL SLIP-FIT STRAIGHT TYPE STUFFING BOX AND PACKING GLAND LEAD ENTRANCE

Figure 9.


Externally threaded gland nut
Internally threaded stuffing box. (Clamp fastened with bolts)
Min. clearance ⅛"
Radial clearance 0.003" max.

TYPICAL SLIP-FIT ANGLE TYPE STUFFING BOX AND PACKING GLAND LEAD ENTRANCE

Plugs shall be secured by spot welding or brazing, weld may be on plug, clamp, or fastening bolt


Plug
Clamp (fastened with bolts)
Radial clearance 0.003" max.

TYPICAL PLUG FOR SPARE LEAD ENTRANCE HOLE

Figure 10

[33 FR 4660, Mar. 19, 1968, as amended at 42 FR 8373, Feb. 10, 1977; 42 FR 25855, May 20, 1977]

Subpart E—Field Approval of Electrically Operated Mining Equipment

AUTHORITY: Secs. 318(i) and 508 of the Federal Coal Mine Health and Safety Act of 1969, Pub. L. 91-173, 83 Stat. 742, 30 U.S.C. 801.

SOURCE: 36 FR 7007, Apr. 13, 1971, unless otherwise noted.

§ 18.90 Purpose.

The regulations of this Subpart E set forth the procedures and requirements for permissibility which must be met to obtain MSHA field approval of electrically operated machinery used or intended for use in by the last open crosscut of a coal mine which has not been otherwise approved, certified or accepted under the provisions of this Part 18, Chapter I, Title 30, Code of Federal Regulations (Bureau of Mines Schedule 2G).

§ 18.91 Electric equipment for which field approvals will be issued.

(a) Individual field approvals will be issued by MSHA under the provisions of this Subpart E for electrically operated machines commercially built, or constructed, by the owner-coal mine operator of such machines including any associated electrical equipment, electrical components, and electrical accessories.

(b) Approvals will not be issued under the provisions of this Subpart E for electrically operated mining equipment manufactured or rebuilt primarily for sale or resale to any operator of a coal mine, or for small electrically operated equipment which consumes less than 2,250 watts of electricity, or for instruments and other small devices which employ electric power.

§ 18.92 Quality of material and design.

(a) Electrically operated machinery approved under the provisions of this Subpart E shall be rugged in construction and shall be designed to facilitate maintenance and inspection.

(b) MSHA shall conduct field investigations and, where necessary, field test electric machinery only where such machinery is found to be constructed of suitable materials and safe for its intended use.

§ 18.93 Application for field approval; filing procedures.

(a)(1) Investigation and testing leading to field approval shall be undertaken by MSHA only pursuant to individual written applications for each machine submitted in triplicate on MSHA Form No. 6-1481, by the owner-coal mine operator of the machine.

(2) Except as provided in paragraph (b) of this section, each application shall be accompanied by appropriate photographs, drawings, specifications, and descriptions as required under the provisions of § 18.94 and each such application shall be filed with the Coal Mine Health and Safety District Manager for the District in which such machine will be employed.

(b) The Coal Mine Health and Safety District Manager may, upon receipt of any application filed pursuant to paragraph (a) of this section, waive the requirements of § 18.94 with respect to such application if he determines that the submission of photographs, drawings, specifications, or descriptions will place an undue financial burden upon the applicant. In the event a waiver is granted in accordance with this paragraph (b), initial review of the application will be waived and the applicant shall be notified on MSHA Form 6-1481 of such waiver and the date, time, and location at which field inspection of the equipment described in the application will be conducted.

(c) Following receipt of an application filed in accordance with paragraph (a) of this section, the Coal Mine Health and Safety District Manager shall determine whether the application has been filed in accordance with § 18.91, and cause the application to be reviewed by a qualified electrical representative to determine compliance with § 18.92:

(1) If it is determined on the basis of the application or the data submitted in accordance with § 18.94 that further consideration of a field approval is warranted under this Subpart E or that the machine appears suitable and safe for its intended use, the Coal Mine Health and Safety District Manager shall advise the applicant in writing that further investigation and inspection of the machine will be necessary. The notice issued by the Coal Mine Health and Safety District Manager shall set forth the time and place at which such inspection will be conducted and specify the location and size of any tapped holes required to be made by the applicant to facilitate the pressure testing of enclosures.

(2) If it is determined on the basis of data submitted in accordance with § 18.94 that the applicant is not qualified to receive an approval or that the machine does not appear to be suitable and safe for its intended use, the Coal Mine Health and Safety District Manager shall so advise the applicant in writing, setting forth the reasons for his denial of the application, and where applicable, the deficiencies in the machine which rendered it unsuitable or unsafe for use.

(3) Rejected applications, together with attached photographs, drawings, specifications and descriptions shall be forwarded by the Coal Mine Health and Safety District Manager to Approval and Certification Center which shall record all pertinent data with respect to the machine for which field approval was sought.

[33 FR 4660, Mar. 19, 1968, as amended at 43 FR 12314, Mar. 24, 1978]

§ 18.94 Application for field approval; contents of application.

(a) Each application for field approval shall, except as provided in § 18.93(b), include the following information with respect to the electrically operated machine for which field approval is sought:

(1) The trade name and the certification number or other means of identifying any explosion-proof compartment or intrinsically-safe component installed on the machine for which a prior approval or certification has been issued under the provisions of Bureau of Mines Schedules 2D, 2E, 2F, or 2G.

(2) The trade name and the flame resistance acceptance number of any cable, cord, hose, or conveyor belt installed on the machine for which a

prior acceptance has been issued under the provisions of §§ 18.36, 18.39, 18.64, or 18.65.

(b) Each application for field approval shall be accompanied by:

(1) If the machine is constructed or assembled entirely from components which have been certified or removed from machines approved under Bureau of Mines Schedule 2D, 2E, 2F, or 2G, photographs or a single layout drawing which clearly depicts and identifies each of the permissible components and its location on the machine.

(2) If the machine contains one or more components required to be permissible which has not been approved or certified under Bureau of Mines Schedule 2D, 2E, 2F, or 2G, a single layout drawing which clearly identifies all of the components from which it was assembled.

(3) All applications shall include specifications for:

(i) Overcurrent protection of motors;

(ii) All wiring between components, including mechanical protection such as hose conduit and clamps;

(iii) Portable trailing cable for use with the machine, including the type, length, diameter, and number and size of conductors;

(iv) Insulated strain clamp for machine end of portable trailing cable;

(v) Short-circuit protection to be provided at outby end of portable trailing cable.

§ 18.95 Approval of machines constructed of components approved, accepted or certified under Bureau of Mines Schedule 2D, 2E, 2F, or 2G.

Machines for which field approval is sought which are constructed entirely from properly identified components that have been investigated and accepted or certified for applications on approved machines under the Bureau of Mines Schedule 2D, 2E, 2F, or 2G, shall be approved following a determination by the electrical representative that the construction of the entire machine is permissible and conforms to the data submitted in accordance with § 18.94.

§ 18.96 Preparation of machines for inspection; requirements.

(a) Upon receipt of written notice from the Health and Safety District Manager of the time and place at which a field approval investigation will be conducted with respect to any machine, the applicant will prepare the machine for inspection in the following manner:

(1) The machine shall be in fresh air out by the last open crosscut and free from obstructions, or, if the machine is located on the surface, moved to a clear area;

(2) All enclosure covers shall be removed;

(3) The flanges and interior of each enclosure, including the cover, shall be cleaned thoroughly;

(4) All hoses, cables, cord, and conveyor belts shall be wiped clean to expose surface markings;

(5) All electrical components shall be cleaned to reveal all stampings, identification plates, certification numbers, or explosion test markings.

§ 18.97 Inspection of machines; minimum requirements.

(a) Except as provided in § 18.95, all machines approved under the provisions of this Subpart E shall, where practicable, meet the minimum design and performance requirements set forth in Subpart B of this Part 18 and, where necessary, the requirements of § 18.98.

(b) The inspection of each machine shall be conducted by an electrical representative and such inspection shall include:

(1) Examination of all electrical components for materials, workmanship, design, and construction;

(2) Examination of all components of the machine which have been approved or certified under Bureau of Mines Schedule 2D, 2E, 2F, or 2G to determine whether such components have been maintained in permissible conditions;

(3) Comparison of the location of components on the machine with the drawings or photographs submitted to determine that each of them is properly located, identified and marked;

(4) Pressure testing of explosion-proof compartments, when necessary, shall be conducted in accordance with § 18.98; and:

(i) Where the results of pressure testing are acceptable, the applicant shall be advised;

(ii) Where the explosion-proof enclosure is found unacceptable, the applicant shall be so informed;

(iii) If the performance of the explosion-proof enclosure is questionable, the qualified electrical representative may, at the request of the applicant, conduct a further detailed examination of the enclosure after disassembly and record his additional findings on MSHA Form No. 6-1481 under Results of Field Inspections.

[33 FR 4660, Mar. 19, 1968, as amended at 42 FR 8373, Feb. 10, 1977]

§ 18.98 Enclosures, joints, and fastenings; pressure testing.

(a) Cast or welded enclosures shall be designed to withstand a minimum internal pressure of 150 pounds per square inch (gage). Castings shall be free from blowholes.

(b) Pneumatic field testing of explosion-proof enclosures shall be conducted by determining:

(1) Leak performance with a peak dynamic or static pressure of 150 pounds per square inch (gage); or

(2) A pressure rise and rate of decay consistent with unyielding components during a pressure-time history as derived from a series of oscillograms.

(c) Welded joints forming an enclosure shall have continuous gastight welds.

§ 18.99 Notice of approval or disapproval; letters of approval and approval plates.

Upon completion of each inspection conducted in accordance with § 18.97(b), the electrical representative conducting such inspection shall record his findings with respect to the machine examined on MSHA Form No. 6-1481 together with his recommendation of approval or disapproval of the machine.

(a) If the qualified electrical representative recommends field approval of the machine, the Coal Mine Health and Safety District Manager shall forward the completed application form together with all attached photographs, drawings, specifications, and descriptions to Approval and Certification Center. Approval and Certification Center shall record all pertinent data with respect to such machine, issue a letter of approval with a copy to the Coal Mine Health and Safety District Manager who authorized its issuance and send the field approval plate to the applicant. The approval plate shall be affixed to the machine by the applicant in such a manner so as not to impair its explosion-proof characteristics.

(b) If the electrical representative recommends disapproval of the machine, he shall record the reasons for such disapproval and the Coal Mine Health and Safety District Manager shall forward the completed application form and other data to Approval and Certification Center which shall record all pertinent data with respect to such machine and notify the applicant that the application for approval has been rejected and the reasons for the rejection.

[33 FR 4660, Mar. 19, 1968, as amended at 42 FR 8373, Feb. 10, 1977; 43 FR 12314, Mar. 24, 1978]

PART 19—ELECTRIC CAP LAMPS

Sec.

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19.13 Instructions for handling future changes in lamp design.

AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, sec. 212, 66 Stat. 709; 30 U.S.C. 3, 5, 7, 482; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L.

91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: Schedule 6D, 4 FR 4003, Sept. 21, 1939, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12314, Mar. 24, 1978.

§ 19.1 Purpose.

(a) The purpose of investigations made under this part is to promote the development of electric cap lamps that may be used in mines, especially in mines that may contain dangerous concentrations of methane. Lists of such lamps will be published from time to time in order that State mine-inspection departments, compensation bureaus, mine operators, miners, and others interested in safe equipment for mines may have information in regard to available permissible electric cap lamps. This part supersedes Schedule 6C issued under date of December 21, 1935, and goes into effect August 26, 1939.

(b) Any electric cap lamp that meets the requirements set forth in this part will be termed "permissible" by MSHA and, if actively marketed, will be listed as such in publications relating to permissible electric cap lamps. MSHA will test only electrical equipment that in the opinion of its qualified representatives is constructed of suitable materials, is of good quality workmanship, is based on sound engineering principles, and is safe for its intended use. MSHA reserves the right to modify design, construction, and test requirements to obtain the same degree of protection as provided by the tests described in this part.

(c) *Definition of permissible.* Completely assembled and conforming in every respect with the design formally approved by the MSHA under this part. (Approvals under this part are given only to equipment for use in gassy and dusty mines.)

NOTE: Paragraph (b) of this section is issued under the authority of Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811). All other paragraphs in this section continue under the original authority.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, 91 Stat. 1291 (30 U.S.C. 811))

[Sched. 6D, 4 FR 4003, Sept. 21, 1939, as amended by Supp. 1, 20 FR 2718, Apr. 23, 1955; 47 FR 11369, Mar. 16, 1982]

§ 19.2 Fees.

(a) Detailed inspection	$105
(b) Safety tests (headpiece)	90
(c) Headpiece dropping	30
(d) Headpiece smash	45
(e) Battery sparking	105
(f) Battery dropping	30
(g) Battery spilling	70
(h) Bulb uniformity (current consumption)	170
(i) Bulb life	135
(j) Light distribution	140
(k) Discharge voltage (battery)	95
(l) Cord slatting	135
(m) Final examination and recording of drawings and specifications requisite to issuing and approval	110
(n) Examining and recording of drawings and specifications requisite to issuing an extension of approval	70
(o) Tests to assist an applicant in evaluating equipment intended for certification may be made at the discretion of MSHA. Written requests for such tests shall be directed to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. A deposit of $200 shall be paid in advance when such tests have been authorized. The fees charged shall be in amounts proportionate to the work performed based on normal charges. Any surplus will be refunded at the completion of the work, or applied to future work, as directed by the applicant.	

[Sched. 6D, 30 FR 3755, Mar. 23, 1965, as amended at 43 FR 12314, Mar. 24, 1978]

§ 19.3 Applications.

Before MSHA will undertake the active investigation leading to approval of any lamp the manufacturer shall make application by letter for an investigation leading to approval of his lamp. This application in duplicate, accompanied by a check, bank draft, or money order, payable to U.S. Mine Safety and Health Administration, to cover all the necessary fees, shall be sent to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 together with the required drawings, one complete lamp, and instructions for its operation.

[Supp. 1, 20 FR 2718, Apr. 23, 1955, as amended at 43 FR 12314, Mar. 24, 1978]

§ 19.4 Conditions governing investigations.

(a) One complete lamp, with the assembly and detail drawings that show the construction of the lamp and the materials of which it is made, should be submitted at the time the application for test is made. This material should be sent prepaid to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059.

(b) When this lamp has been inspected by MSHA, the applicant will be notified as to the amount of material that will be required for the tests. In general, the material required will be as follows: (1) Thirty complete lamps; (2) 500 bulbs; (3) 50 feet of cord; (4) a battery discharge rack for 20 batteries; and (5) a 50-bulb rack. Specifications for items (4) and (5) will be furnished by MSHA.

(c) The applicant will be notified of the date on which the tests will start and will be given an opportunity to witness them.

(d) *Observers at formal investigations and demonstrations.* No one shall be present during any part of the formal investigation conducted by MSHA which leads to approval for permissibility except the necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon by the applicant and MSHA. Upon granting approval for permissibility, MSHA will announce that such approval has been granted to the device and may thereafter conduct, from time to time in its discretion, public demonstrations of the tests conducted on the approved device. Those who attend any part of the investigation, or any public demonstration, shall be present solely as observers; the conduct of the investigation and of any public demonstration shall be controlled by MSHA. Results of chemical analyses of material and all information contained in the drawings, specifications, and instructions shall be deemed confidential and their disclosure will be appropriately safeguarded by MSHA.

(e) Permissibility tests will not be made unless the lamp has been completely developed and is in a form that can be marketed.

(f) The results of the tests shall be regarded as confidential by all present at the tests and shall not be made public in any way prior to the formal approval of the lamp by MSHA.

(g) No verbal report of approval or disapproval will be made to the applicant. After MSHA has considered the results of the tests, a formal report of the approval or disapproval will be made to the applicant in writing by Approval and Certification Center. The applicant shall not advertise the lamp as being permissible or as having passed the tests prior to receipt of formal notice of approval.

[Sched. 6D, 4 FR 4003, Sept. 21, 1939, as amended by Supp. 1, 20 FR 2718, Apr. 23, 1955; 43 FR 12314, Mar. 24, 1978]

§ 19.5 General requirements for approval.

Electric cap lamps shall be complete units. They shall be durable in construction, practical in operation, and suitable for the conditions of underground service. They shall offer no probable explosion hazard if used in gassy or dusty mine atmospheres or bodily hazard from the spilling of the battery electrolyte. They shall exhibit, under laboratory test conditions, the various minimum performance requirements specified in this part.

§ 19.6 Specific requirements for approval.

(a) *Design.* In the determination of the adequacy of the lamp, with respect to design, the following points will be considered: (1) The materials used; (2) construction; (3) weight; (4) amount of light; (5) distribution of light; and (6) exclusion of dust from the headpiece. The suitability of the materials and the construction shall be determined by preliminary inspection, by dropping tests,[1] by durability tests of the cord and cord armor,[2] and by the general behavior of the lamp equipment during the investigation. The amount and distribution of the light shall be judged both by observation of the illumination on a white screen and by photometric measurements.

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[1] Batteries are dropped 3 feet, at least 20 times onto an oak floor. Headpieces are dropped 6 feet, at least 20 times, onto concrete.

[2] Ten cords, assembled with the cord armor and outlet of the lamp with which it is to be used, are slatted at least 100,000 times through an arc of 50 degrees at approximately 90 slattings per minute.

(b) *Angle of light beam.* MSHA recommends that the angle of the light beam be at least 130 degrees horizontally to insure that the contrast edge of the beam is away from the more sensitive sector of the wearer's vision; however, to allow for manufacturing and assembly tolerances and the use of multiple filament bulbs, MSHA will approve lamps giving a minimum beam angle of 120 degrees. If the bulb has more than one major filament, the one giving the smaller angle will be used in the determination.

(c) *Light distribution, visual.* Excepting special headpieces for inspection purposes, the area illuminated by the beam shall be free from sharp gradations in light intensity and spectral shadows.

(d) *Light distribution, photometric.* (1) Excepting special headpieces for inspection purposes, the maximum candlepower of the light beam shall not be greater than 25 times the average or mean candlepower of the beam.[3]

(2) The minimum candlepower of the beam based upon readings at the design voltage of the bulb shall not be less than 1.

§ 19.7 Protection against explosion hazard.

Unless properly designed, electric cap lamps may present two sources of probable explosion hazards: Ignition of an explosive atmosphere by the heated filament of the bulb in case the bulb glass is accidentally broken, and ignition by sparks or flashes from the battery. MSHA therefore requires the following safeguards:

(a) *Safety device or design.* The headpiece shall have a safety device to prevent the ignition of explosive mixtures of methane and air if the bulb glass surrounding the filament is broken. Alternatively, if the lamp is designed and constructed to prevent the ignition of explosive mixtures of methane and air by protecting the bulb from breakage and preventing exposure of the hot filament, no safety device is required.

(b) *Headpiece lock or seal.* The headpiece shall be provided with a lock or seal to prevent unauthorized removal of the lens and tampering with the safety device, the bulb, or the electrical contacts.

(c) *Locks on charging terminals.* Lamps shall be equipped with a magnetic or other equally effective lock at the battery, the headpiece, or the cord assembly to prevent unauthorized access to live charging terminals.

(d) *Protection of battery terminals.* The battery covers of lamps that are recharged through the cord shall be so constructed and assembled as to prevent unauthorized access to the battery terminals.

(e) *Battery current restricted.* The amount of current flow between the conductors of the cord, if short-circuited just outside of the battery casing or cord armor, shall be limited by the design of the battery or by a fuse to such a value[4] as will not produce sparks that will ignite an explosive mixture of methane and air.

(f) It shall not be possible to obtain a difference of potential between any two accessible points of the cap lamp when assembled for use.

NOTE: Paragraph (a) of this section is issued under the authority of Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811). All other paragraphs in this section continue under the original authority.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, 91 Stat. 1291 (30 U.S.C. 811))

[Sch. 6D, 4 FR 4003, Sept. 21, 1939, as amended at 47 FR 11369, Mar. 16, 1982]

§ 19.8 Protection against bodily hazard.

This hazard is chiefly due to the possible burning of the wearer by electrolyte spilled from the battery. MSHA therefore requires that:

(a) *Spilling of electrolyte.* The lamp shall be so designed and constructed that, when properly filled, the battery will neither leak nor spill electrolyte under actual service conditions. Lamps passing a laboratory spilling test will be considered satisfactory in this respect, contingent upon satisfactory performance in service.

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[3] The minimum allowable angle of 120 degrees will be used in determining the mean candlepower of the beam.

[4] The following maximum short-circuit current values may be used as a guide in the design of cap lamp batteries: 100 amperes for a 4-volt battery; 75 amperes for a 6-volt battery; 50 amperes for an 8-volt battery.

(b) *Corrosion of battery container.* The material of which the container is made shall resist corrosion under conditions of use.

§ 19.9 Performance.

In addition to the general design and the safety features, MSHA considers that a lamp of permissible type should meet certain minimum requirements with respect to performance, as follows:

(a) *Time of burning and candlepower.* Permissible electric cap lamps shall burn for at least 10 consecutive hours on one charge of the battery and shall give during that period a mean candlepower of light beam of not less than 1.

(b) *Bulb life.* The average life of the bulbs shall be not less than 200 hours, and at least 92 percent of the bulbs shall have a life of 150 hours. The life of a bulb is the number of hours its main filament will burn in the cap lamp or its equivalent.

The life of a bulb having main filaments in parallel is considered ended when the first filament ceases to burn; the life of a bulb having independent main filament is considered ended when the last filament ceases to burn.

(c) *Bulb uniformity.* (1) The bulbs submitted shall meet the following minimum requirements for variation in current consumption and candlepower:

(2) The current consumption of at least 94 percent of the bulbs shall not exceed the average current by more than 6 percent. The candlepower (s. cp.) of at least 90 percent of the bulbs shall not fall short of the average candlepower by more than 30 percent.

(d) *Corrosion of contacts.* Battery terminals and leads therefrom, as well as the battery gas vents, shall be designed to minimize corrosion of the electrical contacts.

[Sch. 6D, 4 FR 4003, Sept. 21, 1939, as amended at 47 FR 11369, Mar. 16, 1982]

§ 19.10 Material required for MSHA records.

In order that MSHA may know exactly what it has tested and approved, detailed records are kept covering each investigation. These include drawings and actual equipment, as follows:

(a) *Drawings.* The original drawings submitted with the application for the tests and the final drawings, which the manufacturer must submit to MSHA before the approval is granted, to show the details of the lamp as approved. These drawings are used to identify the lamp in the approval and as a means of checking the future commercial product of the manufacturer.

(b) *Actual equipment.* (1) If MSHA so desires, parts of the lamps which are used in the tests will be retained as a permanent record of the investigation and of the lamps submitted.

(2) If the lamp is approved, MSHA will require the manufacturer, as soon as his first manufactured lamps are available, to submit one complete lamp, bearing the approval plate, as a record of his commercial product.

§ 19.11 How approvals are granted.

(a) All approvals are granted by official letter from MSHA. A lamp will be approved under this part only when the testing engineers judge that the lamp has met the requirements of the part and MSHA's records concerning the lamp are complete, including drawings from the manufacturer that show the lamp as it is to be commercially made. No verbal reports of MSHA's decisions, concerning the investigation will be given, and no informal approvals will be granted.

(b) As soon as the manufacturer has received the formal approval he shall be free to advertise his lamps as permissible.

[Sched. 6D, 4 FR 4003, Sept. 21, 1939, as amended by Supp. 1, 20 FR 2718, Apr. 23, 1955]

§ 19.12 Wording, purpose, and use of approval plate.

(a) *Approval plate.* The manufacturer shall attach, stamp, or mold an approval plate on the battery container of each permissible lamp. The plate shall bear the emblem of the Mine Safety and Health Administration and be inscribed as follows: "Permissible Electric Cap Lamp. Approval No. ——— issued to the ————Company." When deemed necessary, an appropriate caution statement shall be added. The size and position of the approval plate shall be satisfactory to MSHA.

(b) *Purpose of approval plate.* The approval plate is a label which identifies the lamp so that anyone can tell at a glance whether or not the lamp is of the permissible type. By it, the manufacturer can point out that his lamp complies with specifications of MSHA and that it has been judged as suitable for use in gassy mines.

(c) *Use of approval plate.* Permission to place MSHA's approval plate on his lamp obligates the manufacturer to maintain the quality of his product and to see that each lamp is constructed according to the drawings which have been accepted by MSHA for this lamp and which are in MSHA's files. Lamps exhibiting changes in design which have not been approved are not permissible lamps and must not bear MSHA's approval plate.

(d) *Withdrawal of approval.* MSHA reserves the right to rescind, for cause, at any time any approval granted under this part.

[Sched. 6D, 4 FR 4003, Sept. 21, 1939, as amended at 43 FR 12314, Mar. 24, 1978]

§ 19.13 Instructions for handling future changes in lamp design.

All approvals are granted with the understanding that the manufacturer will make his lamp according to the drawings which he has submitted to MSHA and which have been considered and included in the approval. Therefore, when he desires to make any change in the design of the lamp, he should first of all obtain MSHA's approval of the change. The procedure is as follows:

(a) The manufacturer shall write to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 requesting an extension of his original approval and stating the change or changes desired. With this letter he should submit a revised drawing or drawings showing the changes in detail, and one of each of changed lamp parts.

(b) MSHA will consider the application and inspect the drawings and parts to determine whether it will be necessary to make any tests.

(c) If no tests are necessary, the applicant will be advised of the approval or disapproval of the change by letter from MSHA.

(d) If tests are judged necessary, the applicant will be advised of the material that will be required and of the necessary deposit to cover the fee for the test.

[Sched. 6D, 4 FR 4003, Sept. 21, 1939, as amended by Supp. 1, 20 FR 2718, Apr. 23, 1955; 43 FR 12314, Mar. 24, 1978]

PART 20—ELECTRIC MINE LAMPS OTHER THAN STANDARD CAP LAMPS

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AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, sec. 212, 66 Stat. 709; 30 U.S.C. 3, 5, 7, 482; sec. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 80 U.S.C. 957, 83 Stat. 803.

SOURCE: Schedule 10C, May 17, 1938, as amended at 5 FR 3467, Aug. 30, 1940, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12314, Mar. 24, 1978.

§ 20.0 Compliance with the requirements necessary for obtaining approval.

To receive approval of MSHA for any electric mine lamps other than standard cap lamps a manufacturer must comply with the requirements specified in this part.

§ 20.1 Purpose.

(a) The purpose of the investigations made under this part is to aid in the development and use of electric lamps, other than standard cap lamps, that may be used in mines, especially in mines that may contain dangerous proportions of methane.

(b) This part supersedes Schedule 10B, issued under date of June 1, 1932, and Schedule 11A, issued under date of January 13, 1936, and goes into effect May 17, 1938.

(c) Electric lamps and flashlights that meet the requirements set forth in this part will be termed "permissible" by MSHA, and if actively marketed will be listed as such in publications relating to permissible equipment, in order that State mine inspection departments, compensation bureaus, mine operators, miners, and others interested in safety equipment for mines may have information in regard to electric lamps and flashlights approved by MSHA.

§ 20.2 Definitions.

(a) *Adequate.* Appropriate and sufficient as determined by mutual agreement between the manufacturer and MSHA.

(b) *Approval.* Official notification in writing from MSHA to a responsible organization, stating that upon investigation its lamp has been adjudged satisfactory under the requirements of this part.

(c) *Explosion-proof compartment.* An enclosure that withstands internal explosions of methane-air mixtures without damage to itself or discharge of flame and without ignition of surrounding explosive methane-air mixtures.

(d) *Permissible.* Completely assembled and conforming in every respect with the design formally approved by MSHA under this part. (Approvals under this part are given only to equipment for use in gassy and dusty mines.)

[Sched. 10C, May 17, 1938, as amended by Supp. 1, 20 FR 2718, Apr. 23, 1955]

§ 20.3 Applications.

Before MSHA will undertake the active investigation leading to approval of any lamp, the manufacturer shall make application by letter for an investigation of his lamp. This application in duplicate, accompanied by a check, bank draft, or money order, payable to the U.S. Mine Safety and Health Administration, to cover all the necessary fees, shall be sent to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, together with the required drawings, one complete lamp, and instructions for its operation.

[Supp. 1, 20 FR 2718, Apr. 23, 1955, as amended at 43 12314, Mar. 24, 1978]

§ 20.4 Fees.

(a) Detailed inspection [1]	$60
(b) Safety tests in gas [1]	90
(c) Battery sparking [2]	105
(d) Battery spilling [3]	70
(e) Dropping [1]	30
(f) Bumping [4]	100
(g) Explosion tests [5]	70
(h) Final examination and recording of drawings and specifications requisite to issuing an approval	110
(i) Examining and recording drawings and specifications requisite to issuing an extension of approval	70
(j) Tests to assist an applicant in evaluating equipment intended for certification may be made at the discretion of MSHA. Written requests for such tests shall be directed to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. A deposit of $200 shall be paid in advance when such tests have been authorized. The fees charged shall be in amounts proportionate to the work performed based on normal charges. Any surplus will be refunded at the completion of the work, or applied to future work, as directed by the applicant.	

[1] Applies to all lamps.
[2] Applies only if cord is involved.
[3] Applies only to storage-battery lamps.
[4] Applies only to trip lamps.
[5] Applies only to units in explosion-proof housings.

[Sched. 10C, 30 FR 3755, Mar. 23, 1965, as amended at 43 FR 12314, Mar. 24, 1978]

§ 20.5 Conditions governing investigations.

(a) One complete lamp, with assembly and detail drawings that show the construction of the lamp and the materials of which it is made, should be submitted at the time the application for investigation is made. This material should be sent prepaid to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059

(b) When the lamp has been inspected by MSHA, the applicant will be notified as to the amount of material that will be required for the test. He will also be notified of the date on which the tests will start and will be given an opportunity to witness the tests.

(c) *Observers at formal investigations and demonstrations.* No one shall be present during any part of the formal investigation conducted by MSHA which leads to approval for permissibility except the necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon by the applicant and MSHA. Upon granting approval for permissibility, MSHA will announce that such approval has been granted to the device and may thereafter conduct, from time to time in its discretion, public demonstrations of the tests conducted on the approved device. Those who attend any part of the investigation, or any public demonstration, shall be present solely as observers; the conduct of the investigation and of any public demonstration shall be controlled by MSHA. Results of chemical analyses of material and all information contained of material and all information contained in the drawings, specifications, and instructions shall be deemed confidential and their disclosure will be appropriately safeguarded by MSHA.

(d) Permissibility tests will not be made unless the lamp is complete and in a form that can be marketed.

(e) The results of the tests shall be regarded as confidential by all present at the tests and shall not be made public in any way prior to the formal approval of the lamp by MSHA.

(f) No verbal report of approval or disapproval will be made to the applicant. Approval will be made only in writing by MSHA. The applicant shall not be free to advertise the lamp as being permissible, or as having passed the tests, prior to receipt of formal notice of approval.

[Sched. 10C, May 17, 1938, as amended by Supp. 1, 20 FR 2719, Apr. 23, 1955; 43 FR 12314, Mar. 24, 1978]

§ 20.6 General requirements.

(a) The lamps shall be durable in construction, practical in operation, and suitable for the service for which they are designed and approved.

(b) The intensity of light, distribution of light, and battery capacity shall be adequate for the use for which the lamp is intended.

(c) Battery terminals and leads therefrom, as well as the battery gas vents, shall be designed to minimize corrosion of the electrical contacts.

(d) Bulbs and other replacement parts of the lamps shall be adequately marked as a means of identification.

§ 20.7 Specific requirements.

Two general classes of electric lamps are recognized in these requirements, namely: Class 1, those that are self-contained and easily carried by hand, and class 2, those that may or may not be self-contained and not so readily portable as the first class.

(a) *Class 1.* Class 1 includes hand lamps, signal lamps, inspection lamps, flashlights, and animal lamps which are operated by small storage batteries or dry cells.

(b) *Class 2.* Class 2 includes lamps such as the pneumatic-electric types and large battery lamps.

§ 20.8 Class 1 lamps.

(a) *Protection against explosion hazards.* Unless properly designed, class 1 lamps present two sources of probable explosion hazards: Ignition of an explosive atmosphere by the heated filament of the bulb in case the bulb glass is accidentally broken, and ignition by electric sparks or arcs from the battery or connections thereto. MSHA's therefore, requires the following safeguards:

(1) *Safety device.* The lighting unit shall be provided with a safety device which shall prevent the ignition of explosive mixtures of methane and air by the heated filament if the bulb

glass surrounding the filament is broken.

(2) *Safety device (protection).* The design of the safety device and the housing which protects it shall be such that the action of the safety device is positive; yet the lamp shall not be too readily extinguished during normal service by the unnecessary operation of the device.

(3) *Locks or seals.* For lamps other than flashlights, all parts, such as bulb housing and battery container, through which access may be had to live terminals or contacts shall be adequately sealed or equipped with magnetic or other equally reliable locks to prevent opening by unauthorized persons. For flashlights, provision shall be made for sealing the battery container.

(4) *Battery current restricted.* Unless all current-carrying parts including conductors, are adequately covered and protected by the sealed or locked compartments, the maximum possible current flow through that part shall be limited by battery design, or by an enclosed-type fuse inside the sealed or locked container, to values that will not produce sparks or arcs sufficient to ignite an explosive mixture of methane and air.

(b) *Protection against bodily hazard.* This hazard is chiefly due to the possible burning of the user by electrolyte spilled from the battery. MSHA, therefore, requires that:

(1) *Spilling of electrolyte.* The lamp shall be so designed and constructed that when properly filled the battery will neither leak nor spill electrolyte under conditions of normal use. Lamps passing a laboratory spilling test will be considered satisfactory in this respect, contingent upon satisfactory performance in service.

(2) *Corrosion of battery container.* The material of which the container is made shall resist corrosion under conditions of normal use.

§ 20.9 Class 2 lamps.

(a) *Safety.* (1) Unless special features of the lamp prevent ignition of explosive mixtures of methane and air by the broken bulb or other igniting sources within the lamp, the bulb and all spark-producing parts must be enclosed in explosion-proof compartments.

(2) Explosion-proof compartments will be tested while filled and surrounded with explosive mixtures of Pittsburgh natural gas[1] and air. A sufficient number of tests of each compartment will be made to prove that there is no danger of ignition of the mixture surrounding the lamp by explosions within the compartment. The lamp will not pass the above tests, even though the surrounding explosive mixtures are not ignited, if external flame is observed, if excessive pressures are developed, or if excessive distortion of any part of the compartment takes place.

(3) Glass-enclosed parts of such compartments must be guarded and be of extra-heavy glass to withstand pick blows, and be adequately protected by shrouds or by an automatic cut-out that opens the lamp circuit if the enclosure is broken.

(4) When an explosion-proof enclosure consists of two or more parts that are held together securely by bolts or some suitable means to permit assembly, the flanges comprising the joints between parts shall have surfaces with metal-to-metal contact, except enclosures requiring glass, in which case glass-to-metal joints are permitted. Gaskets, if adequate, may be used to obtain a firm seat for the glass but not elsewhere. Rubber, putty, and plaster of paris are not acceptable as material for gaskets. For enclosures having an unoccupied volume (air space) of more than 60 cubic inches the width of the joint measured along the shortest flame path from the inside to the outside of the enclosure shall not be less than 1 inch. When the unoccupied volume (air space) is less than 60 cubic inches, this path shall not be less than three-fourths inch.

(b) *Locks and seals (lighting attachment).* Explosion-proof compartments shall be equipped with seals or locks that prevent unauthorized and unsafe opening of the compartments in a mine.

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[1] Investigation has shown that for practical purposes Pittsburgh natural gas (containing a high percentage of methane) is a satisfactory substitute for pure methane.

(c) *Locks or seals (battery).* The battery shall be enclosed in a locked or sealed container that will prevent exposure of live terminals.

(d) *Temperature of lamp.* The temperature of the lamp under conditions of use shall not be such that a person may be burned in handling it.

(e) *Cable and connection.* (1) The cable or cord connecting the lamp to its battery shall be of high-grade design and materials, comparable to the specially recommended trailing cables as listed by MSHA, and shall be not more than 15 feet in length.

(2) The cable (or cord) shall be adequately protected at the battery end by a fuse in the locked battery box or housing. The cable (or cord) and the fuse shall be considered parts of the lamp, and specifications for them shall be submitted by the lamp manufacturer.

(3) The method of terminating the cable (or cord) at the lamp and at the battery housing shall be adequate, but in no case shall the cable or cord be detachable.

MSHA reserves the right to make minor changes in the requirements outlined in paragraphs (e) (1), (2), and (3) of this section (No. 9, class 2 lamps), as experience and service prove to be necessary in the interests of safety.

§ 20.10 Tests (class 1 and 2 lamps).

Such tests will be made as are necessary to prove the adequacy of a lamp or any of its parts in fulfilling the purposes for which it was designed. These tests include the following:

(a) Safety tests, including tests of safey devices, electrical contacts, and explosion-proof features.

(b) Photometric tests.

(c) Tests to demonstrate adequacy of mechanical strength.

(d) Tests of nonspilling features (storage-battery lamps of class 1).

(e) Temperature tests.

§ 20.11 Material required for MSHA records.

In order that MSHA may know exactly what it has tested and approved, detailed records are kept covering each investigation. These include drawings and actual equipment, as follows:

(a) *Drawings.* The original drawings submitted with the application for the tests and the final drawings which the manufacturer must submit to MSHA before approval is granted, to show the details of the lamp as approved, are retained. These drawings are used to identify the lamp and its parts in the approval and as a means of checking the future commercial product of the manufacturer.

(b) *Equipment.* (1) If MSHA so desires, parts of the lamps which are used in the tests will be retained as a permanent record of the investigation and of the lamps submitted.

(2) If the lamp is approved, MSHA will require the manufacturer, as soon as his first manufactured lamps are available, to submit one complete lamp, with the approval plate attached, as a record of his commercial product.

§ 20.12 How approvals are granted.

(a) All approvals are granted by official letter from MSHA. A lamp will be approved under this part only when the testing engineers judge that the lamp has met the requirements of this part and after MSHA's records concerning the lamp are complete, including manufacturer's drawings that show the lamp as it is to be made commercially. No verbal reports of MSHA's decision concerning the investigation will be given, and no informal approvals will be granted.

(b) As soon as the manufacturer has received the formal approval he shall be free to advertise his lamp as permissible.

[Sched. 10C, May 17, 1938, as amended by Supp. 1, 20 FR 2719, Apr. 23, 1955]

§ 20.13 Approval plate.

The manufacturer shall attach, stamp, or mold an approval plate on the battery container or housing of each permissible lamp. The plate shall bear the emblem of the Mine Safety and Health Administration, and be inscribed as follows: "Permissible ———— Lamp. Approval No. ———————— issued to the ——————— Company." When deemed necessary, an appropriate caution statement shall be added. The size, material, and position of the approval plate shall be satisfactory to MSHA.

(a) *Purpose of approval plate.* The approval plate is a label which identifies the lamp so that anyone can tell at a glance whether the lamp is of the permissible type or not. By it the manufacturer can point out that his lamp complies with specifications of MSHA and that it has been adjudged safe for use in gassy and dusty mines.

(b) *Use of approval plate.* Permission to place MSHA's approval plate on his lamp obligates the manufacturer to maintain the quality of his product and to see that each lamp is constructed according to the drawings which have been accepted by MSHA for this lamp and which are in the MSHA files. Lamps exhibiting changes in design which have not been approved are not permissible lamps and must not bear MSHA's approval plate.

(c) *Withdrawal of approval.* MSHA reserves the right to rescind for cause at any time any approval granted under this part.

[Sched. 10C, May 17, 1939, as amended at 5 FR 3467, Aug. 30, 1940; 43 FR 12314, Mar. 24, 1978]

§ 20.14 Instructions for handling future changes in lamp design.

All approvals are granted with the understanding that the manufacturer will make his lamp according to the drawings which he has submitted to MSHA and which have been considered and included in the approval. Therefore, when he desires to make any change in the design of the lamp, he should first of all obtain an extension of the original approval to cover the change. The procedure is as follows:

(a) The manufacturer shall write to the Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, requesting an extension of his original approval and describing the change or changes proposed. With this letter he should submit a revised drawing or drawings showing the changes in detail, and one of each of the changed lamp parts.

(b) MSHA will consider the application and inspect the drawings and parts to determine whether it will be necessary to make any tests.

(c) If no tests are necessary, the applicant will be advised of the acceptance or rejection of the proposed change by letter from MSHA.

(d) If tests are judged necessary, the applicant will be advised of the material that will be required and of the necessary deposit to cover the fee for the test.

[Sched. 10C, May 17, 1938, as amended by Supp. 1, 20 FR 2719, Apr. 23, 1955; 43 FR 12314, Mar. 24, 1978]

PART 21—FLAME SAFETY LAMPS

Sec.
21.0 Compliance with the requirements necessary for obtaining approval.
21.1 Purpose.
21.2 Definitions.
21.3 Fees.
21.4 Applications.
21.5 Conditions governing investigations.
21.6 General requirements.
21.7 Material required for MSHA records.
21.8 How approvals are granted.
21.9 Approval plate.
21.10 Instructions for handling future changes in lamp design.

AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, sec. 212, 66 Stat. 709; 30 U.S.C. 3, 5, 7, 482; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 80 U.S.C. 957, 83 Stat. 803.

SOURCE: Schedule 7C, Aug. 30, 1935, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12314, Mar. 24, 1978.

§ 21.0 Compliance with the requirements necessary for obtaining approval.

To receive approval of MSHA for any flame safety lamps a manufacturer must comply with the requirements specified in this part.

§ 21.1 Purpose.

(a) The purpose of investigations under this part is to make available flame lamps that may be safely used for detecting the presence of methane and deficiency of oxygen in mine atmospheres. Lists of such lamps will be published from time to time in order that State mine-inspection departments, compensation bureaus, mine operators, miners, and others interested in safe equipment for the mines may have information regarding permissible flame safety lamps. This part supersedes Schedule 7B, issued September 19, 1922, and goes into effect August 30, 1935.

(b) Any flame safety lamp that meets the requirements of this part will be termed permissible by MSHA and if actively marketed will be listed as such in publications relating to permissible mining equipment.

§ 21.2 Definitions.

(a) *Permissible.* Completely assembled and conforming in every respect with the design formally approved by MSHA under this part. (Approvals under this part are given only to equipment for use in gassy and dusty mines.)

(b) *Adequate.* Adequate means appropriate and sufficient as determined by mutual agreement between the manufacturer and MSHA.

[Sched. 7C, Aug. 30, 1935, as amended by Supp. 1, 20 FR 2961, May 3, 1955]

§ 21.3 Fees.

(a) Detailed inspection	$105
(b) Mechanical tests of complete lamp:	
1 Dropping test	30
2 Impact test with 5# weight	35
3 Tension test with 10# weight	35
4 Bonnet test (pendulum impact)	35
5 Temperature of external parts	65
(c) Mechanical tests of glasses:	
1 Impact test with 1# weight	35
2 Temperature test	45
(d) Safety tests—moving and still mixtures	155
(e) Safety test—igniter	65
(f) Time of burning	35
(g) Detection of methane and deficiency of oxygen	70
(h) Final examination and recording of drawings and specifications requisite to issuing an approval	110
(i) Examining and recording drawings and specifications requisite to issuing an extension of approval	70

(j) Tests to assist an applicant in evaluating equipment intended for certification may be made at the discretion of MSHA. Written requests for such tests shall be directed to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. A deposit of $200 shall be paid in advance when such tests have been authorized. The fees charged shall be in amounts proportionate to the work performed based on normal charges. Any surplus will be refunded at the completion of the work, or applied to future work, as directed by the applicant.

[Sched. 7C, 30 FR 3755, Mar. 23, 1965, as amended at 43 FR 12314, Mar. 24, 1978]

§ 21.4 Applications.

Before MSHA will undertake the active investigation leading to approval of any lamp, the manufacturer shall make application by letter for an investigation of his lamp. This application in duplicate, accompanied by a check, bank draft, or money order, payable to the U.S. Mine Safety and Health Administration, to cover all the necessary fees, shall be sent to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 together with the required drawings, one complete lamp, and instructions for its operation.

[Supp. 1, 20 FR 2961, May 3, 1955, as amended at 43 FR 12314, 12315, Mar. 24, 1978]

§ 21.5 Conditions governing investigations.

(a) One complete lamp, with drawings that show the construction of the lamp and the material of which it is made, together with a set of operating instructions, should be forwarded prepaid to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 at the time the application for tests is made.

(b) When these have been inspected by MSHA the applicant will be notified as to the amount of material that will be required for the tests. The applicant will be notified also of the date on which the tests will be started and will be given an opportunity to witness the tests.

(c) *Observers at formal investigations and demonstrations.* No one shall be present during any part of the formal investigation conducted by MSHA which leads to approval for permissibility except the necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon by the applicant and MSHA. Upon granting approval for permissibility, MSHA will announce that such approval has been granted to the device and may thereafter conduct, from time to time in its discretion, public demonstrations of the tests conducted on the approved device. Those who attend any part of the investigation, or any public demonstration, shall be present solely as observers; the conduct of the investigation and of any public demonstration shall be controlled by MSHA. Results of chemical analyses of material and all information contained in the drawings, specifications, and instructions shall be deemed confidential and their disclosure will be appropriately safeguarded by MSHA.

[Sched. 7C, Aug. 30, 1935, as amended by Supp. 1, 20 FR 2961, May 3, 1955; 43 FR 12314, Mar. 24, 1978]

§ 21.6 General requirements.

(a) *Safety in gaseous atmospheres.* (1) Lamps shall be so constructed that they will not cause external ignitions when tested in gassy or dusty atmospheres, such as may be found in coal mines.

(2) Special tests will be made to determine the safety of the igniter device as follows:

(i) To determine whether external ignition is possible when the igniter is operated within the lamp in still mixtures of Pittsburgh natural gas and air.

(ii) To determine whether the residue left in the lamp after working the igniter device is a source of danger in the subsequent use of the lamp.

(iii) To determine the nature of the materials of the sparking material.

(b) *Construction involving safety, operation, and maintenance.* Lamps will be examined with special reference to their mechanical construction, strength, size, and weight, the replacement of parts, the ease of inspection, and the attention required to maintain proper operation. The construction shall be such that the omission or incorrect placing of any part when assembling the lamp may be readily noticed. Provision shall be made for the protection of glass chimneys against breakage by expansion or by shock.

(1) *Lock.* Lamps shall be provided with a magnetic lock that is adequate to prevent the loosening or removal, from the locked lamp, of any part vital to safety.

(2) *Gauzes.* If gauzes are used they shall be adequate for the safety required. Adequacy will be determined by tests in moving and still mixtures of Pittsburgh natural gas and air, and by inspection of the gauzes relative to the following:

(i) The material of which the gauzes are made.

(ii) The gauze mesh.

(iii) The fabrication of the gauzes, particularly as to uniformity and distortion at seams.

(iv) The relative dimensions of inner and outer gauzes.

(3) *Glasses.* The adequacy of the glasses will be based upon the following:

(i) *The quality and form of the glass.* The glasses shall have smooth surfaces throughout and should be clear. Their ends should be parallel and at right angles to the axis of the glass.

(ii) *Resistance to breakage.* The glasses will be tested to show their resistance to mechanical blows, both alone and when assembled in the lamp, and to sudden temperature changes, such as being sprayed by water at a temperature 85° C. lower than that of the heated glasses.

(iii) *Identification.* The glasses shall be marked distinctly and permanently by a name or design, by which they are to be designated commercially.

(iv) *Protection of the glass against breakage.* Standards or other means used for protection of the glass should protect the glass from breakage except under a direct blow against the glass.

(4) *Bonnet.* (i) The lamp shall be equipped with a bonnet to shield the gauze from the direct action of air currents. The adequacy of the bonnet will be determined as follows:

(ii) The completely assembled lamp will be suspended as a pendulum, the point of suspension being 6 feet above the center of the bonnet. The lamp will be withdrawn 45 degrees from the vertical and allowed to swing freely against the edge of a rigid, flat steel bar one-fourth inch thick, the edge being vertically under the point of suspension. Inward deformation of the bonnet from its normal shape or position shall be not greater than 10 percent of the original outside diameter of the lamp bonnet. The lower openings of the bonnet shall not be materially distorted by this test.

(5) *Performance.* The lamp shall give the following performance:

(i) It shall give positive evidence of the presence of methane and of deficiency of oxygen in mine atmospheres, either through observation of the flame or by a suitable attachment, showing a definite indication in concentrations as low as 1 percent methane.

(ii) It shall have a free-burning, steady flame, sufficient fuel capacity to give 12 hours burning per filling with its normal flame, and a wick adjustment that is simple and dependable.

§ 21.7 Material required for MSHA records.

In order that MSHA may know exactly what it has tested and approved, detailed records are kept covering each investigation. These include drawings and actual equipment, as follows:

(a) *Drawings.* The original drawings submitted with the application for tests and the final drawings which the manufacturer must submit to MSHA before the approval is granted, to show the details of the lamp as approved. These drawings are used to identify the lamp in the approval and as a means of checking the future commercial product of the manufacturer.

(b) *Actual equipment.* (1) If MSHA so desires, parts of the lamps which are used in tests will be retained as a permanent record of the investigation and of the lamps submitted.

(2) If the lamp is approved, MSHA will require the manufacturer, as soon as his first manufactured lamps are available, to submit one complete lamp, with the approval plate attached, as a record of his commercial product.

§ 21.8 How approvals are granted.

(a) All approvals are granted by official letter from MSHA. A lamp will be approved under this part only when the testing engineers judge that the lamp has met the requirements of the schedule and MSHA's records concerning the lamp are complete, including drawings from the manufacturer that show the lamp as it is to be made commercially. No verbal reports of MSHA's decisions concerning the investigation will be given, and no informal approvals will be granted.

(b) As soon as the manufacturer has received the formal approval he shall be free to advertise his lamp as permissible.

[Sched. 7C, Aug. 30, 1935, as amended by Supp. 1, 20 FR 2961, May 3, 1955]

§ 21.9 Approval plate.

The manufacturer shall attach, stamp, or mold an approval plate on each permissible lamp. The plate shall bear the emblem of the Mining Enforcement and Safety Administration, and be inscribed as follows: "Permissible Flame Safety Lamp. Approval No. ——————— issued to the ——————— Company." When deemed necessary, an appropriate caution statement shall be added. The size and position of the approval plate shall be satisfactory to MSHA.

(a) *Purpose of approval plate.* The approval plate is a label which identifies the lamp so that anyone can tell at a glance whether the lamp is or is not of the permissible type. By it the manufacturer can point out that his lamp complies with specifications of MSHA and that it has been adjudged safe for use in gassy mines.

(b) *Use of approval plate.* Permission to place MSHA's approval plate on his lamp obligates the manufacturer to maintain the quality of his product and to see that each lamp is constructed according to the drawings which have been accepted by MSHA for this lamp and which are in MSHA's files. Lamps exhibiting changes in design which have not been approved are not permissible lamps and must not bear MSHA's approval plate.

(c) *Withdrawal of approval.* MSHA reserves the right to rescind for cause at any time any approval granted under this schedule.

[Sched. 7C, Aug. 30, 1935, as amended at 43 FR 12314, Mar. 24, 1978]

§ 21.10 Instructions for handling future changes in lamp design.

All approvals are granted with the understanding that the manufacturer will make his lamp according to the drawings which he has submitted to MSHA and which have been considered and included in the approval. Therefore, when he desires to make any change in the design of the lamp, he should first of all obtain MSHA's approval of the change. The procedure is as follows:

(a) The manufacturer shall write to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 requesting an extension of his original approval and stating the change or changes desired. With this letter he should submit a revised drawing or drawings showing the changes in detail and one of each of the changed lamp parts.

(b) MSHA will consider the application and inspect the drawings and parts to determine whether it will be necessary to make any tests.

(c) If no tests are necessary the applicant will be advised of the approval or disapproval of the change through the Administrator's office.

(d) If tests are judged necessary the applicant will be advised of the material that will be required and of the deposit necessary to cover the fee for the test.

[Sched. 7C, Aug. 30, 1935, as amended by Supp. 1, 20 FR 2961, May 3, 1955; 43 FR 12314, Mar. 24, 1978]

PART 22—PORTABLE METHANE DETECTORS

Sec.
22.0 Compliance with the requirements necessary for obtaining approval.
22.1 Purpose.
22.2 Definitions.
22.3 Fees.
22.4 Applications.
22.5 Conditions governing investigations.
22.6 General requirements.
22.7 Specific requirements.
22.8 Material required for MSHA records.
22.9 How approvals are granted.
22.10 Approval plate.
22.11 Instructions on handling future changes in design.

AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, sec. 212, 66 Stat. 709; 30 U.S.C. 3, 5, 7, 482; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 80 U.S.C. 957, 83 Stat. 803.

SOURCE: Schedule 8C, Oct. 31, 1935, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12315, Mar. 24, 1978.

§ 22.0 Compliance with the requirements necessary for obtaining approval.

To receive approval of MSHA for any portable methane detectors a manufacturer must comply with the requirements specified in this part.

§ 22.1 Purpose.

(a) The purpose of investigations under this part is to provide portable methane detectors that may be safely used in mines. Lists of such detectors will be published from time to time in order that State mine-inspection departments, compensation bureaus, mine operators, miners, and others interested in safe equipment for mines may have information in regard to permissible methane detectors. This part supersedes Schedule 8B, issued under date of November 17, 1926, and goes into effect October 31, 1935.

(b) Any methane detector that meets the requirements set forth in this part will be termed permissible by MSHA and if actively marketed will be listed as such in publications relating to permissible mining equipment.

§ 22.2 Definitions.

(a) *Methane detector.* A methane detector is a device that may be used to detect the presence of methane in a gassy mine.

(b) *Methane-indicating detector.* A methane-indicating detector is a device that will show, within certain limits of error, on an adequate scale, the percentage of methane in a gassy atmosphere.

(c) *Permissible.* Completely assembled and conforming in every respect with the design formally approved by MSHA under this part. (Approvals under this part are given only to equipment for use in gassy and dusty mines.)

[Sched. 8C. Oct. 31. 1955, as amended by Supp. 1. 20 FR 2575. Apr. 19. 1955]

§ 22.3 Fees.

(a) Detailed inspection	$105
(b) Safety-intrinsically safe circuits	85
(c) Battery spilling	70
(d) Battery dropping	30
(e) Accuracy	100
(f) Life tests of replaceable components	100
(g) Field tests	155
(h) Final examination and recording of drawings and specifications requisite to issuing an approval	110
(i) Examining and recording drawings and specifications requisite to issuing an extension of approval	70
(j) Tests to assist an applicant in evaluating equipment intended for certification may be made at the discretion of MSHA. Written requests for such tests shall be directed to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. A deposit of $200 shall be paid in advance when such tests have been authorized. The fees charged shall be in amounts proportionate to the work performed based on normal charges. Any surplus will be refunded at the completion of the work, or applied to future work, as directed by the applicant.	

[Sched. 8C, 30 FR 3755, Mar. 23, 1965, as amended at 43 FR 12315, Mar. 24, 1978]

§ 22.4 Applications.

Before MSHA will undertake the active investigation leading to approval of any methane detector, the manufacturer shall make application by letter for an investigation leading to approval of his detector. This application in duplicate, accompanied by a check, bank draft, or money order, payable to the U.S. Mine Safety and Health Administration, to cover all the necessary fees, shall be sent to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 together with the required drawings, one complete detector, and instructions for its operation.

[Supp. 1, 20 FR 2575, Apr. 19, 1955, as amended at 43 FR 12315, Mar. 24, 1978]]

§ 22.5 Conditions governing investigations.

(a) One complete detector, with assembly and detail drawings that show the construction of the device and the materials of which it is made, should be forwarded prepaid to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 at the time the application for tests is made.

(b) When this has been inspected by MSHA, the applicant will be notified as to the amount of material that will be required for the tests. The manufacturer will be notified of the date on which the tests will be started and will be given an opportunity to witness the tests.

(c) *Observers at formal investigations and demonstrations.* No one shall be present during any part of the formal investigation conducted by MSHA which leads to approval for permissibility except the necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon by the applicant and MSHA. Upon granting approval for permissibility, MSHA will announce that such approval has been granted to the device and may thereafter conduct, from time to time in its discretion, public demonstrations of the tests conducted on the approved device. Those who attend any part of the investigation, or any public demonstration, shall be present solely as observers; the conduct of the investigation and of any public demonstration shall be controlled by MSHA. Results of chemical analyses of material and all information contained in the drawings, specifications, and instructions shall be deemed confidential and their disclosure will be appropriately safeguarded by MSHA.

[Sched. 8C, Oct. 31, 1935, as amended by Supp. 1, 20 FR 2575, Apr. 19, 1955; 43 FR 12315, Mar. 24, 1978]

§ 22.6 General requirements.

Methane detectors approved under this part shall be portable. They shall be durable in construction, practical in operation, and suitable for service conditions underground. They shall offer no probable explosion hazard if used in gaseous mine atmospheres nor any bodily hazard, such as spilling of battery electrolyte. They shall exhibit under laboratory test conditions various requirements of minimum performance that are specified in this part.

§ 22.7 Specific requirements.

(a) *Design.* In the determination of adequacy of design, the following points will be considered: (1) Materials used, (2) construction, (3) accuracy, (4) size and shape, (5) range of detection (or indication), (6) life of the active parts, and (7) attention required. The suitability of the materials and the construction shall be determined by preliminary inspection, by dropping tests, by laboratory and field tests in gas and air mixtures, and by the general behavior of the equipment during the investigation.

(b) *Safety against explosion hazard*—(1) *Detectors.* Detectors shall be constructed so that they will not cause external ignitions when used in gaseous mine atmospheres.

(2) *Seals or locks.* All parts through which external ignitions might result shall be covered and protected adequately. All covers shall be sealed adequately or equipped with magnetic or other equally reliable locks to prevent their being opened by unauthorized persons.

(3) *Glasses.* Glasses or glass windows shall be of good-quality glass and protected adequately against breakage. Unguarded windows may be considered adequate in this respect, provided they are of small diameter and are of reasonably thick glass.

(4) *Battery.* If the detector is equipped with a battery, it shall be of such design that it will not produce sparks that will ignite an explosive mixture of methane and air.

(5) *Detectors of the flame type.* Methane detectors of the flame type shall be subject to the requirements of the flame-lamp schedule then in force.

(c) *Safety against bodily hazard.* Bodily hazard with battery-type detectors is due chiefly to possible burning of the user by electrolyte that has spilled from the battery. MSHA, therefore, requires that:

(1) *Spilling of electrolyte.* The battery shall be so designed and constructed that when properly filled it will not spill electrolyte under actual service conditions.

(2) *Corrosion of battery container.* The material of which the container is made shall resist corrosion under conditions of use.

(d) *Performance.* In addition to the general design and safety features, MSHA considers that permissible types of methane detectors should meet certain minimum requirements with respect to their performance, as follows:

(1) *Detectors.* (i) When the detector is operated according to the manufacturer's instructions, it shall be possible to detect at least 1 percent methane in air, and increasing percentages up to 5 percent shall be shown by continuously increasing evidence.

(ii) The average number of determinations that may be made in approximately 2-percent methane mixtures without recharging a battery or replacing a chemical accessory shall not be less than 25, and the average number of such determinations that may be made without replacing any other part shall be not less than 100.

(2) *Indicating detectors.* Indicating detectors shall give indications of as low as 0.25 percent methane. Detectors having an upper scale limit of 2 percent may be approved, but it is recommended that the detector be designed to give indications of as high as 4 percent methane. The indications for these percentages shall be within the limits of error specified in the following table:

ALLOWABLE VARIATIONS IN SCALE READING

[In percent]

Methane in mixtures	Minimum indication	Maximum indication
0.25	0.10	0.40
.50	.35	.65
1.00	.80	1.20
2.00	1.80	2.20
3.00	2.70	3.30
4.00	3.70	4.30

(i) Tests shall be made at several percentages within the range of the indicating detector and at temperatures between the limits of 50° and 70° F. by increments of 5°. Ten determinations shall be made at each percentage. Neither the average of the 10 readings nor more than 2 readings for each percentage shall exceed the limits of error given in the table.

(ii) The average number of determinations that may be made with an indicating detector without replacement of any part shall be not less than 30, and the average number that may be made without recharging the battery shall be not less than 15.

(iii) The scale shall not be subdivided into smaller divisions than the general accuracy of the indicating detector warrants.

(3) *Mechanical strength.* Detectors and indicating detectors shall be subjected to the following mechanical tests: Four of each of those parts or groups of assembled parts that are not normally strapped to the user shall be dropped 20 times on a wood floor from a height of 3 feet. Parts that are strapped to the user may be subjected to a jarring or bumping test to demonstrate adequate strength. The average number of times that any one of the detectors can be dropped before breakage or material distortion of essential parts shall be not less than 10.

(e) *Attachments for illumination.* If detectors are provided with attachments for illuminating purposes, such attachments shall be subject to the same requirements as those applying to that type of lamp under the lamp schedule then in force.

§ 22.8 Material required for MSHA records.

In order that MSHA may know exactly what it has tested and approved, it keeps detailed records covering each investigation. These records include drawings and actual equipment as follows:

(a) *Drawings.* The original drawings submitted with the application for the tests and the final drawings which the manufacturer must submit to MSHA before the approval is granted to show the details of the detector as approved, are retained. These drawings are used to identify the detector in the approval and as a means of checking the future commercial product of the manufacturer.

(b) *Actual equipment.* If MSHA so desires, parts of the detectors that are used in the tests will be retained as records of the equipment submitted. If the detector is approved, MSHA will require the manufacturer to submit one of his detectors, with the approval plate attached, as a record of his commercial product.

§ 22.9 How approvals are granted.

All approvals are granted by official letter from MSHA. A detector will be approved under this part only when the testing engineers have judged that it has met the requirements of the schedule and MSHA's records are complete, including drawings from the manufacturer that show the detector as it is to be commercially made. No verbal reports of the investigation will be given and no informal approvals will be granted. As soon as the manufacturer has received the formal approval, he shall be free to advertise his detector as permissible.

[Sched. 8C, Oct. 31, 1935, as amended by Supp. 1, 20 FR 2575, Apr. 19, 1955]

§ 22.10 Approval plate.

(a) *Attachment to be made by manufacturers.* (1) Manufacturers shall attach, stamp, or mold an approval plate on each permissible methane detector. The plate shall bear the emblem of the Mines Safety and Health Administration and be inscribed as follows:

Permissible Methane Detector (or Permissible Methane Indicating Detector) Approval No.———issued to the——————————— Company.

(2) When deemed necessary, an appropriate caution statement shall be added. The size and position of the approval plate shall be satisfactory to MSHA.

(b) *Purpose of approval plate.* The approval plate is a label that identifies the device so that anyone can tell at a glance whether it is of the permissible type or not. By the plate, the manufacturer can point out that his detector complies with MSHA's requirements and that it has been approved for use in gassy mines.

(c) *Use of approval plate.* Permission to place MSHA's approval plate on his detector obligates the manufacturer to maintain the quality of his product and to see that each detector is constructed according to the drawings that have been accepted by MSHA and are in MSHA's files. Detectors exhibiting changes in design that have not been approved are not permissible and must not bear MSHA's approval plate.

(d) *Withdrawal of approval.* MSHA reserves the right to rescind for cause at any time any approval granted under this part.

[Sched. 8C, Oct. 31, 1935, as amended at 43 FR 12315, Mar. 24, 1978]

§ 22.11 Instructions on handling future changes in design.

All approvals are granted with the understanding that the manufacturer will make his detector according to the drawings that he has submitted to MSHA and that have been considered and included in the approval. Therefore, when he desires to make any changes in the design he should first of all obtain MSHA's approval of the change. The procedure is as follows:

(a) The manufacturer should write to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va, 26059 requesting an extension of his original approval and stating the change or changes desired. With this request, he should submit a revised drawing or drawings showing changes in detail, together with one of each of the parts affected.

(b) MSHA will consider the application and inspect the drawings and parts to determine whether it will be necessary to make any tests.

(c) If no tests are necessary, the applicant will be advised of the approval or disapproval of the change by letter from MSHA.

(d) If tests are judged necessary, the applicant will be advised of the material that will be required and of the necessary deposit to cover the fee for the tests.

[Sched. 8C, Oct. 31, 1935, as amended by Supp. 1, 20 FR 2575, Apr. 19, 1955; 43 FR 12315, Mar. 24, 1978]

PART 23—TELEPHONES AND SIGNALING DEVICES

Sec.

23.1 Purpose.
23.2 Definitions.
23.3 Applications.
23.4 Fees.
23.5 Conditions governing investigations.
23.6 General requirements for approval.
23.7 Specific requirements for approval.
23.8 Inspection and tests.
23.9 Special requirements for complete devices.
23.10 Material required for MSHA records.
23.11 How approvals are granted.
23.12 Wording, purpose, and use of approval plate.
23.13 Withdrawal of approval.
23.14 Instructions for handling future changes in design.

Authority: Secs. 2, 3, 5, 36 Stat. 370, as amended, sec. 212, 66 Stat. 709; 30 U.S.C. 3, 5, 7, 482; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

Source: Schedule 9B, 4 FR 1555, Apr. 11, 1939, unless otherwise noted.

Note: Nomenclature changes appear at 43 FR 12315, Mar. 24, 1978.

§ 23.1 Purpose.

(a) The purpose of investigations under this part is to promote the development of telephones and signaling devices that may be used safely in mines, especially in coal mines that may have gassy or dust-laden atmospheres. This schedule supersedes Schedule 9A, issued under date of December 5, 1922, and becomes effective October 18, 1938.

(b) Telephones and signaling devices approved under the requirements of this part will be termed "permissible" by MSHA, and if actively marketed will be listed as such in publications relating to permissible equipment, for the information of State mine inspection departments, compensation bureaus, mine operators, miners, and others interested in safety equipment for mines.

§ 23.2 Definitions.

(a) "Adequate" means appropriate and sufficient, as determined by mutual agreement of the manufacturer, operators, and MSHA.

(b) "Approval" means official notification by letter, from MSHA to a responsible organization, stating that the device under consideration has been judged to meet the requirements of this part.

(c) "Normal operation" means the performance by each part of the device of those functions for which the part was designed.

(d) "Permissible" as used in this part means completely assembled and conforming in every respect with the design formally approved by MSHA under this part. (Approvals under this part are given only to equipment for use in gassy and dusty mines.)

(e) "Protected" means effectively covered, enclosed, or otherwise guarded by adequate covers.

(f) "Signaling device." As used in this part, a signaling device is one that gives visual or audible signals.

(g) "MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor orgainzation to MSHA, prior to March 9, 1978.

(h) "MSHA" means the U.S. Department of Labor, Mine Safety and Health Administration.

NOTE: Paragraph (f) of this section is issued under the authority of Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811). All other paragraphs in this section continue under the original authority.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, 91 Stat. 1291 (30 U.S.C. 811))

[Sched. 9B, 4 FR 1555, Apr. 11, 1939, as amended by Supp. 1, 20 FR 2975, May 4, 1955; 39 FR 24001, June 28, 1974; 43 FR 12315, Mar. 24, 1978; 47 FR 11370, Mar. 16, 1982]

§ 23.3 Applications.

Before MSHA will undertake the active investigation leading to approval of any telephone or signaling service, the manufacturer shall make application by letter for an investigation leading to approval of his device. This application in duplicate, accompanied by a check, bank draft, or money order, payable to the U.S. Mine and Safety and Health Administration, to cover all the necessary fees, shall be sent to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 together with the required drawings, one complete telephone or signaling device, and instructions for its operation.

OMB CONTROL NO. 1219-0066. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[Supp. 1, 20 FR 2975, May 4, 1955, as amended at 43 FR 12315, Mar. 24, 1978; 47 FR 14696, Apr. 6, 1982]

§ 23.4 Fees.

(a) Detailed inspection	$60
(b) Explosion tests (each compartment)	70
(c) Intrinsic safety	85
(d) Life tests of replaceable parts	100
(e) Final examination and recording of drawings and specifications requisite to issuing an approval	110
(f) Examining and recording drawings and specifications requisite to issuing an extension of approval	70
(g) Tests to assist an applicant in evaluating equipment intended for certification may be made at the discretion of MSHA. Written requests for such tests shall be directed to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. A deposit of $200 shall be paid in advance when such tests have been authorized. The fees charged shall be in amounts proportionate to the work performed based on normal charges. Any surplus will be refunded at the completion of the work, or applied to future work, as directed by the applicant.	

[Sched. 9B, 30 FR 3755, Mar. 23, 1965, as amended at 43 FR 12315, Mar. 24, 1978]

§ 23.5 Conditions governing investigations.

(a) One complete device together with assembly and detail drawings that show its construction and the materials of which the parts are made, shall be submitted preferably at the time the application for test is made. These shall be sent prepaid to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059.

(b) After the device has been inspected by MSHA, the applicant will be notified as to the amount of material that he will be required to supply for the tests and of the date on which testing will be started.

(c) *Observers at formal investigations and demonstrations.* No one shall be present during any part of the formal investigation conducted by MSHA which leads to approval for permissibility except the necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon by the applicant and MSHA. Upon granting approval for permissibility, MSHA will announce that such approval has been granted to the device and may thereafter conduct, from time to time in its discretion, public demonstrations of the tests conducted on the approved device. Those who attend any part of the investigation, or any public demonstration, shall be present solely as observers; the conduct of the investigation and of any public demonstration shall be controlled by MSHA. Results of chemical analyses of material and all information contained in the drawings, specifications, and instructions shall be deemed confidential and their disclosure will be appropriately safeguarded by MSHA.

(d) Formal tests will not be made unless the device has been completely developed and is in a form that can be marketed.

(e) The results of the tests shall be regarded as confidential by all present at the tests and shall not be made public in any way prior to the formal approval of the device by MSHA.

(f) No verbal report of approval or disapproval will be made to the applicant. After MSHA has considered the results of the inspections and tests, a formal written report of the approval or disapproval will be made to the applicant by MSHA. The applicant shall not advertise his device as being permissible or approved, or as having passed the tests, prior to receipt of the formal notice of approval.

[Sched. 9B, 4 FR 1555, Apr. 11, 1939, as amended by Supp. 1, 20 FR 2975, May 4, 1955; 43 FR 12315, Mar. 24, 1978]

§ 23.6 General requirements for approval.

Telephones and signaling devices shall be durable in construction, practical in operation, and suitable for conditions of underground service. They shall offer no probable explosion hazard under normal operation if use in gassy or dusty mine atmospheres.

§ 23.7 Specific requirements for approval.

(a) The circuits external to telephones and signal devices shall be intrinsically safe; that is, the electrical design and construction of telephones and signal devices shall be such that neither contact between wires comprising the external circuits nor contact of tools or other metal objects with external terminals and circuits will result in electrical sparks capable of igniting explosive methane-air mixtures (or such mixtures with coal dust in suspension) during normal operation of the telephones or signal devices.

(b) All parts which, during normal operation, are capable of producing sparks that might ignite explosive methane-air mixtures shall be enclosed in explosion-proof compartments. All openings in the casings of such compartments shall be adequately protected. It is desirable that openings be as few as possible. All joints in the casings of an explosion-proof compartment shall be metal-to-metal so designed as to have a width of contact, measured along the shortest path from the inside to the outside of the compartment, of not less than 1 inch if the unoccupied volume (air space) in the compartment is more than 60 cubic inches. For unoccupied volume of 60 cubic inches or less, a ¾-inch width of contact will be acceptable.

(c) All bolts and screw holes shall be "blind" or bottomed if the omission of a bolt or screw would otherwise leave an opening into the compartment. An adequate lock or seal shall be provided to prevent tampering and exposure of spark-producing parts by unauthorized persons.

(d) Battery cells shall be placed in an explosion-proof compartment or else in one that is locked or sealed, and the terminals and the connections thereto shall be so arranged and protected as to preclude meddling, tampering, or making other electrical connections with them.

(e) Manufacturers shall furnish adequate instructions for the installation and connection of telephones and signal devices in order that the safety of these devices and other circuits shall not be diminished by improper installation. MSHA reserves the right to require the attachment of wiring diagrams to the cases of telephones and signal devices.

(f) If electric light bulbs are used in signaling devices, they shall be either equipped with effective safety devices, such as are required for permissible electric mine lamps,[1] or enclosed in explosion-proof compartments.

(g) Line powered telephones and signaling devices or systems shall be equipped with standby power sources that have the capacity to enable the devices or systems to continue functioning in the event the line power fails or is cut off. Manufacturers shall furnish instructions for the proper maintenance of standby power sources.

NOTE: Paragraph (g) of this section is issued under the authority of Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811). All other paragraphs in this section continue under the original authority.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, 91 Stat. 1291 (30 U.S.C 811))

[Sch. 9B, 4 FR 1555, Apr. 11, 1939, as amended at 47 FR 11370, Mar. 16, 1982]

§ 23.8 Inspection and tests.

(a) A thorough inspection of the telephone or signaling device will be made to determine its adequacy and permisibility. Tests may be made to check the electrical characteristics and constants of the various parts, and determine the adequacy of the insulation and other parts of features of the device.

(b) In addition, compartments of explosion-proof design will be tested while filled and surrounded with explosive mixtures containing varying percentages of Pittsburgh natural gas[2] and air, the mixture within the compartment being ignited by a spark plug or other suitable means. For some of the tests bituminous-coal dust will be introduced into the compartment in addition to the explosive mixtures, and the effects will be noted. A sufficient number of tests will be made under the foregoing conditions to determine the ability of the compartment to retain flame without bursting. Even though the surrounding mixtures are not ignited, the compartment will not be considered as having passed the tests, if flames are discharged from any joint or opening; if excessive pressures are developed or if serious distortion of the compartment walls take place.

§ 23.9 Special requirements for complete devices.

Telephones and signaling devices will be considered nonpermissible if used under any of the followings conditions:

(a) Without the approval plate, mentioned hereafter.

(b) With unprotected openings in any of the explosion-proof compartments. This condition refers to any openings in these compartments, but especially to those equipped with removable covers.

(c) If not complete with all of the parts considered in the approval.

(d) If installed or connected otherwise than in accordance with the instructions furnished by the manufacturer.

(e) If modified in any manner not authorized by MSHA.

§ 23.10 Material required for MSHA records.

In order that MSHA may know exactly what it has tested and approved, it keeps detailed records covering each investigation. These records include drawings and actual equipment as follows:

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[1] In this case, the requirements of the current schedule for mine lamps will apply.

[2] Investigation has shown that for test purposes Pittsburgh natural gas (containing a high percentage of methane) is a satisfactory substitute for pure methane.

(a) *Drawings.* The original drawings submitted with the application for the tests and the final drawings which the manufacturer must submit to MSHA before the approval is granted, to show the details of the device as approved. These drawings are used to identify the device in the approval and as a means of checking the future commercial product of the manufacturer.

(b) *Actual equipment.* If MSHA so desires, parts of the devices that are used in the tests will be retained as records of the equipment submitted. If the device is approved, MSHA reserves the right to require the manufacturer to submit one, with the approval plate attached and without cost to MSHA, as a record of his commercial product.

§ 23.11 How approvals are granted.

All approvals are granted by official letter from MSHA. A device will be approved under this part only when the testing engineers have judged that it has met the requirements of the part and MSHA's records are complete, including drawings from the manufacturer that show the device as it is to be commercially made. Individual parts of devices will not be approved. No verbal reports of the investigation will be given and no informal approvals will be granted. As soon as the manufacturer has received the formal approval, he shall be free to advertise his device as permissible.

[Sched. 9B, 4 FR 1555, Apr. 11, 1939, as amended by Supp. 1, 20 FR 2975, May 4, 1955]

§ 23.12 Wording, purpose, and use of approval plate.

(a) *Approval plate.* (1) Manufacturers shall attach, stamp, or mold an approval plate on each permissible device. The plate shall bear the emblem of the Mine Safety and Health Administration and be inscribed as follows:

Permissible Telephone (or Permissible Signaling Device) Approval No.———Issued to the ——————————————— Company.

(2) When deemed necessary, an appropriate caution statement shall be added. The size and position of the approval plate shall be satisfactory to MSHA.

(b) *Purpose.* The approval plate is a label that identifies the device so that anyone can tell at a glance whether or not it is of the permissible type. By the plate, the manufacturer can point out that his device complies with MSHA's requirements and that it has been approved for use in gassy or dusty mines.

(c) *Use.* Permission to place MSHA's approval plate on his device obligates the manufacturer to maintain the quality of his product and to see that each device is constructed according to the drawings that have been accepted by MSHA and are in MSHA's files. Devices exhibiting changes in design that have not been authorized are not permissible and must not bear MSHA's approval plate.

[Sched. 9B, 4 FR 1555, Apr. 11, 1939, as amended at 43 FR 12315, Mar. 24, 1978]

§ 23.13 Withdrawal of approval.

MSHA reserves the right to rescind for cause at any time any approval granted under this part.

§ 23.14 Instructions for handling future changes in design.

All approvals are granted with the understanding that the manufacturer will make his device according to the drawings that he has submitted to MSHA and that have been considered and included in the approval. Therefore, before making any changes in the design he shall obtain MSHA's authorization of the change. The procedure is as follows:

(a) The manufacturer shall write to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 requesting an extension of his original approval and stating the change or changes desired. With this request, he should submit a revised drawing or drawings showing the changes in detail, together with one of each of the parts affected.

(b) MSHA will consider the application and inspect the drawings and parts to determine whether it will be necessary to make any tests.

(c) If no tests are necessary, and the change meets the requirements, the applicant will be officially advised by MSHA that his original approval has been extended to include the change.

(d) If tests are judged necessary, the applicant will be advised of the material that will be required and of the necessary deposit to cover the fee for the tests. In this case extension of approval will be granted upon satisfactory completion of the tests and full compliance with the requirements.

[Sched. 9B, 4 FR 1555, Apr. 11, 1939, as amended by Supp. 1, 20 FR 2975, May 4, 1955; 43 FR 12315, Mar. 24, 1978]

PART 24—SINGLE-SHOT BLASTING UNITS

Sec.
24.0 Authorization and purpose.
24.1 Fees.
24.2 Applications.
24.3 Conditions governing investigations.
24.4 Requirements for approval.
24.5 Materials required for MSHA records.
24.6 Approvals.
24.7 Approval plate.
24.8 Withdrawal of approval.
24.9 Future changes in design.

AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, sec. 212, 66 Stat. 709; 30 U.S.C. 3, 5, 7, 482; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: Schedule 12D, 10 FR 14895, Dec. 11, 1945, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12315, Mar. 24, 1978.

§ 24.0 Authorization and purpose.

(a) Investigations under this part are conducted under the authorization of the Federal Mine Safety and Health Act of 1977 (Pub. L. 91-173, as amended by Pub. L. 95-164).

(b) The purpose of investigations under this part is to promote the development of safe types of single-shot blasting units that may be used in mines, especially in mines that may contain methane or inflammable dust in dangerous proportions. Lists of such units will be published from time to time so that State mine-inspection departments, compensation bureaus, mine operators, miners, and others interested in safe equipment for mines may have information regarding permissible blasting units. This part supersedes Schedule 12C issued under date of July 16, 1940 (30 CFR, 1943 Cum. Supp., Part 24), and goes into effect November 27, 1945.

(c) Any blasting unit that meets the requirements set forth in this part will be termed "permissible" by MSHA.

(d) Definition of permissible. Completely assembled and conforming in every respect with the design formally approved by MSHA under this part. (Approvals under this part are given only to equipment for use in gassy and dusty mines.)

(e) "MSHA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to March 9, 1978.

(f) "MSHA" means the United States Department of Labor, Mine Safety and Health Administration.

[Sched. 12D, 10 FR 14895, Dec. 11, 1945, as amended by Supp. 1, 20 FR 2719, Apr. 23, 1955; 39 FR 24001, June 28, 1974; 43 FR 12315, Mar. 24, 1978]

§ 24.1 Fees.

(a) Detailed inspection	$60
(b) Intrinsic safety tests	85
(c) Life tests of replaceable parts or complete unit	270
(d) Discharge voltage test	50
(e) Firing capacity test	80
(f) Dropping test	30
(g) Final examination and recording of drawings and specifications requisite to issuing an approval	110
(h) Examining and recording drawings and specifications requisite to issuing an extension of approval	70
(i) Tests to assist an applicant in evaluating equipment intended for certification may be made at the discretion of MSHA. Written requests for such tests shall be directed to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. A deposit of $200 shall be paid in advance when such tests have been authorized. The fees charged shall be in amounts proportionate to the work performed based on normal charges. Any surplus will be refunded at the completion of the work, or applied to future work, as directed by the applicant.	

[Sched. 12D, 30 FR 3755, Mar. 23, 1965, as amended at 43 FR 12315, Mar. 24, 1978]

§ 24.2 Applications.

Before MSHA will undertake the active investigation leading to approval of any single-shot blasting unit, the manufacturer shall make application by letter for an investigation leading to approval of his unit. This application in duplicate, accompanied by a check, bank draft, or money order, payable to the U.S. Mine Safety and Health Safety Administration, to cover all the necessary fees, shall be sent to Approval and Certification Center, Box 201B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 together with the required drawings, one complete blasting unit, and instructions for its operation.

[Sched. 12D, 10 FR 14895, Dec. 11, 1945, as amended at 43 FR 12315, Mar. 24, 1978]

§ 24.3 Conditions governing investigations.

(a) One complete blasting unit, with drawings that show the construction of the device and the materials of which it is made, should be forwarded to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 at the time the application for tests is made.

(b) When this has been inspected by MSHA, the applicant will be notified as to the amount of material that will be required for the tests.

(c) The applicant will be notified of the date on which the tests will be started and will be given an opportunity to witness the tests.

(d) Observers at formal investigations and demonstrations. No one shall be present during any part of the formal investigation conducted by MSHA which leads to approval for permissibility except the necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon by the applicant and MSHA. Upon granting approval for permissibility, MSHA will announce that such approval has been granted to the device and may thereafter conduct, from time to time in its discretion, public demonstrations of the tests conducted on the approved device. Those who attend any part of the investigation, or any public demonstration, shall be present solely as observers; the conduct of the investigation and of any public demonstration shall be controlled by MSHA. Results of chemical analyses of material and all information contained in the drawings, specifications, and instructions shall be deemed confidential and their disclosure will be appropriately safeguarded by MSHA.

(e) Permissibility tests will not be made unless the unit has been completely developed and is a form that can be marketed.

(f) The results of the tests shall be regarded as confidential by all present at the tests and shall not be made public in any way before the shot-firing unit is formally approved by MSHA.

(g) No verbal report of approval or disapproval will be made to the applicant. After MSHA has considered the results of the tests, a formal report of the approval or disapproval will be made to the applicant in writing by MSHA. The applicant shall not advertise the unit as being permissible or as having passed the tests before he receives formal notice of approval.

[Sched. 12D, 10 FR 14895, Dec. 11, 1945, as amended by Supp. 1, 20 FR 2719, Apr. 23, 1955; 43 FR 12315, Mar. 24, 1978]

§ 24.4 Requirements for approval.

Single-shot blasting units approved under this part shall be practical in construction and operation as well as suitable for service conditions underground. They shall offer no probable ignition hazard when used in gassy mine atmospheres. They shall meet, under laboratory test conditions, the following requirements of minimum performance:

(a) The unit shall fire consistently single electric blasting caps through a total resistance of 4½ ohms.

(b) The unit shall not produce sparks capable of igniting explosive mixtures of methane and air.[1]

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[1] Sparking tests of battery-type units will be made with a contactor disk 8 inches in diameter equipped with brush-type contacts, each of approximately 50 No. 34 copper wires. The contactor will be surrounded by an explosive mixture of Pittsburgh natural

Continued

(c) Units of the battery type shall be designed to prevent accidental connection to the firing circuit. Batteries having a short-circuit current greater than 10 amperes, shall be enclosed in an effectively locked or sealed housing.

(d) Storage batteries supplying current for both blasting and illumination at the same time shall have ample capacity for the combined service or shall be equipped with an automatic device that cuts off the lamp during shot firing. The lamp part of the unit shall meet the requirements of the current lamp schedules.

(e) Magneto units shall be operable only by a special key or handle.

(f) A unit that depends on some special modification such as a shunt resistance, to prevent igniting sparks, shall have its housing sealed or locked to prevent removal or disturbance of this safety feature.

[Sched. 12D, 10 FR 14895, Dec. 11, 1945, as amended by Supp. 1, 20 FR 2719, Apr. 23, 1955]

§ 24.5 Materials required for MSHA records.

In order that MSHA may know exactly what it has tested and approved, it keeps detailed records covering each investigation. These records include drawings and actual equipment, as follows:

(a) *Drawings.* The original drawings submitted with the application for approval and any drawings that are needed to show changes in design. These drawings are used to identify the unit in the approval and to check the future product of the manufacturer.

(b) *Actual equipment.* If MSHA so desires, parts of the units that are used in the tests will be retained as records of the equipment submitted. If the unit is approved, MSHA will require the manufacturer to submit one of his units, with the approval plate attached, as a record of his future commercial product.

§ 24.6 Approvals.

All approvals are granted by letter from MSHA. A blasting unit will be approved under this part only when the testing engineers shall have judged that it has met the requirements of the schedule and MSHA's records are complete, including drawings from the manufacturer that show the unit as it is to be made. No verbal reports of the investigation will be given, and no informal approval will be granted. The manufacturer shall not advertise his blasting unit as permissible or approved until he has received the formal notification of approval from MSHA.

[Sched. 12D, 10 FR 14895, Dec. 11, 1945, as amended by Supp. 1, 20 FR 2719, Apr. 23, 1955]

§ 24.7 Approval plate.

(a) *Design.* Manufacturers shall attach, stamp, or mold an approval plate on each permissible single-shot blasting unit. The plate shall bear the emblem of the Mine Safety and Health Administration, and be inscribed as follows:

> Permissible Single-Shot Blasting Unit, Approval No. ———— issued to the ———————— Co.

When deemed necessary, an appropriate cautionary statement shall be added. A photograph of the approval plate design will be supplied to the manufacturer with the approval letter. The size and position of the approval plate adopted shall be satisfactory to MSHA.

(b) *Purpose.* The approval plate is a label that identifies the device so that anyone can tell at a glance whether or not it is of the permissible type. By the plate, the manufacturer can point out that his blasting unit complies with MSHA's requirements, and that it has been approved for use in gassy mines.

(c) *Significance.* Permission to place the approval plate on his unit obli-

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gas and air. The test shall consist of making and breaking the discharge of each of three units at least 300 times with the contactor operating at 60 revolutions per minute. The resistance of the contactor circuit shall not be greater than 0.25 ohm. Similar tests will be made of magneto- and generator-type units but with the contactor equipped with a 1/16-inch bronze brush and brass contact and operating at speeds up to 1,200 revolutions per minute.

gates the manufacturer to maintain the quality of his product and to see that each unit is constructed according to the drawings that have been accepted and placed on file by MSHA. Blasting units exhibiting changes in design that have not been authorized by MSHA are not permissible and must not bear the approval plate.

[Sched. 12D, 10 FR 14895, Dec. 11, 1945, as amended at 43 FR 12315, Mar. 24, 1978]

§ 24.8 Withdrawal of approval.

MSHA reserves the right to rescind for cause, at any time, any approval granted under this part.

§ 24.9 Future changes in design.

All approvals are granted with the understanding that the manufacturer will make each blasting unit according to the drawings that were submitted to MSHA and that have been included in the approval. Changes in the design shall not be made without first obtaining MSHA's authorization, procedure for which is as follows:

(a) The manufacturer shall write to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 requesting an extension of his original approval and stating the change or changes desired. A copy of the letter, a revised drawing of the change in detail, and one of each of the parts affected shall be sent by the manufacturer to Approval and Testing, Pittsburgh Technical Support Center, 4800 Forbes Avenue, Pittsburgh, Pa. 15213.

(b) MSHA will consider the application and inspect the drawings and parts to determine whether it will be necessary to make any tests.

(c) If MSHA finds the change to be acceptable without test, extension of approval authorizing the change will be granted in writing from MSHA.

(d) If tests are judged necessary, the applicant will be advised of the material that will be required and of the necessary deposit to cover the fee for the tests. When the changed design has been found to comply with the requirements of this schedule, extension of approval authorizing the changes will be granted.

[Sched. 12D, 10 FR 14895, Dec. 11, 1945, as amended by Supp. 1, 20 FR 2719, Apr. 23, 1955; 43 FR 12315, Mar. 24, 1978]

PART 25—MULTIPLE-SHOT BLASTING UNITS

Subpart A—General Provisions

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Subpart B—Blasting Units Capable of Detonating 10 Short-Delay Electric Detonators

25.20 Definition.
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Subpart C—Blasting Units Capable of Detonating 20 Short-Delay Electric Detonators

25.25 Definition.
25.26 Specifications.

AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, secs. 201, 209, 212, 66 Stat. 692, 703, 709; 30 U.S.C. 3, 5, 7, 471, 479, 482; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: Schedule 16E, 25 FR 4645, May 26, 1960, unless otherwise noted.

NOTE: Nomenclature changes to appear at 43 FR 12315, Mar. 24, 1978.

Subpart A—General Provisions

§ 25.1 Purpose.

The regulations in this part set forth the specifications and requirements for multiple-shot blasting units to procure their approval and certification as permissible for use in coal mines;

procedures for applying for such certification; and fees.

§ 25.2 Definitions.

As used in this part:

(a) "Permissible," as applied to a multiple-shot blasting unit, means that the unit conforms to the specifications and requirements of this part, and that a certificate of approval to that effect has been issued.

(b) "Certificate of approval" means a formal document issued by MSHA stating that the unit has met the specifications and requirements in this part and authorizing the use and attachment of an official approval plate.

(c) "Blasting unit" means an apparatus for detonating high explosives by applying electric current to electric detonators.

(d) "Multiple-shot blasting unit" means a blasting unit capable of detonating short-delay electric detonators, as further defined in § 25.20 or § 25.25.

(e) "Short-delay electric detonator" means a delay-type detonator (blasting cap) the delay periods of which range in nominal value from 25 to 500 milliseconds, and which will initiate (detonate) multiple charges of high explosives in succession with one application of the firing current.

(f) "MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to March 9, 1978.

(g) "MSHA" means the United States Department of Labor, Mine Safety and Health Administration.

(h) "Applicant" means an individual, partnership, company, corporation, association, or other organization that designs, manufactures, or assembles, and that seeks a certificate of approval or preliminary testing of a multiple-shot blasting unit.

[Sched. 16E, 25 FR 4645, May 26, 1960, as amended at 39 FR 24002, June 28, 1974; 43 FR 12315, Mar. 24, 1978]

§ 25.3 Consultation.

By appointment, applicants or their representatives may visit Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 to discuss with qualified MSHA representatives proposed designs of equipment to be submitted in accordance with the requirements of the regulations of this part. No charge is made for such consultation.

[Sched. 16E, 25 FR 4645, May 26, 1960, as amended at 43 FR 12315, Mar. 24, 1978]

§ 25.4 Fees.

(a) Detailed inspection	$60
(b) Timing and energy requirement determination	165
(c) Safety tests in methane-air mixtures	150
(d) High-potential test	40
(e) Dropping test	30
(f) Life test of complete unit	270
(g) Firing-capacity test	130
(h) Final examination and recording of drawings and specifications requisite to issuing an approval	110
(i) Examining and recording drawings and specifications requisite to issuing an extension of approval	70
(j) Tests to assist an applicant in evaluating equipment intended for certification may be made at the discretion of MSHA. Written requests for such tests shall be directed to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. A deposit of $200 shall be paid in advance when such tests have been authorized. The fees charged shall be in amounts proportionate to the work performed based on normal charges. Any surplus will be refunded at the completion of the work, or applied to future work, as directed by the applicant.	

[Sched. 16E, 30 FR 3756, Mar. 23, 1965, as amended at 43 FR 12315, Mar. 24, 1978]

§ 25.5 Tests and investigations.

Unless the application states otherwise, it will be presumed that a complete investigation for certification is desired. However, the application may be expressly limited to some element or phase less than a complete investigation; and in any case if the tests at any stage indicate that the unit does not conform to the specification in this part, MSHA may treat the application as one for a partial investigation up to that point. Complete investigation for certification will not be undertaken unless the unit has been fully developed, is ready to be marketed, and is submitted completely assembled. The minimum material required for tests will be four complete units and such additional expendable parts as MSHA may require.

§ 25.6 Applications.

(a) No investigation or testing will be undertaken by MSHA except pursuant to a written application, in duplicate, accompanied by a check, bank draft, or money order, payable to the U.S. Mine Safety and Health Administration, to cover the fees, and all prescribed drawings, specifications, and related material. The application and all related matters and all correspondence concerning it shall be sent to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va 26059.

(b) The unit to be tested may be shipped (charges prepaid) at the same time the application is submitted, or at the option of the applicant shipment of the unit may be deferred until MSHA has notified the applicant that the application will be accepted.

(c) Drawings and specifications shall be adequate in number and detail to identify fully the design of the unit and to disclose its materials, detailed dimensions of all parts, and wiring diagram. Drawings must be numbered and dated to insure accurate identification and reference to records, and must show the latest revision. Specifications must be given for materials, components, and subassemblies.

[Sched. 16E, 25 FR 4645, May 26, 1960, as amended at 43 FR 12315, Mar. 24, 1978]

§ 25.7 Specifications; all types of units.

(a) MSHA will not test or investigate any unit that in its opinion is not constructed of suitable materials, that evidences faulty workmanship, or that is not designed upon sound engineering principles. In addition to any specifications or requirements imposed by the regulations in this part, MSHA may impose such further specifications or requirements as in its opinion are necessary or proper to investigate or test the particular device submitted.

(b) Any unit that satisfies all of the requirements of this part may be certified as permissible.

(c) Adequacy of design and construction will be determined in connection with the following factors: Kind and durability of materials, test of active parts, resistance to moisture, drop test, insulation measurements, durability of construction, practicality in operation, suitability for underground service, and performance characteristics during the investigation.

(d) The unit shall not ignite explosive gas-air mixtures or cause misfires or premature firing when operated according to the applicant's prescribed conditions of use, which shall be acceptable to MSHA.

(e) The firing operation must be accomplished by a removable key or other acceptable means to prevent accidental or premature firing.

(f) A suitable means, incorporated as an integral part of the blasting unit, shall be provided to indicate, before each round of shots is fired, that the voltage applied to the firing line is adequate to meet the requirements as stated in paragraphs (h) and (i) of this section. An automatic means to prevent inadvertent or deliberate firing prior to the indication of readiness shall be incorporated in the unit.

(g) The voltage must be cut off or be reduced within 15 milliseconds (0.015 second) after the firing contact is made to such a value that no incendive spark (an electric spark of sufficient intensity to ignite flammable methane-air mixtures) can result from accidental postfiring contact of wires in the firing circuit.

(h) The average current produced by the unit shall be not less than 1.5 amperes, based on a 5-millisecond application to the bridgewire of the short-delay electric detonators. The unit shall be so designed that discontinuities in the firing circuit of the unit shall not be possible during the specified firing time.

(i) The energy applied to the firing circuit of the blasting unit shall be as stated in § 25.21(a) or § 25.26(a).

(j) The difference of potential at the terminals of the blasting unit shall be as stated in § 225.21(b) or § 25.26(b).

(k) Terminals of the unit for connecting the firing (blasting) cable shall be well insulated, without exposed parts that can become "alive" when energized.

(l) The unit shall have a shunt resistance or other means acceptable to MSHA to limit the voltage across the firing-line terminals, except during periods of charging and firing.

(m) The housing for the unit shall be sealed to prevent tampering with the contents and mechanically strong for mine service.

(n) The unit shall meet electrical leakage and clearance tests. The voltage for testing shall be twice the maximum voltage employed in the shot-firing unit. These tests shall be made in an atmosphere of at least 80 percent relative humidity.

§ 25.8 Specifications; particular types of units.

(a) Generator type: The energy output shall not depend upon the physical effort of an operator of the blasting unit.

(b) Generator or battery, condenser-discharge type:

(1) Condensers must be capable of withstanding 25,000 charge and discharge cycles at the normal rate specified by the applicant.

(2) An automatic means shall be provided to insure that no electrical charge will remain in the condenser(s) when the blasting unit is not in use.

(3) Firing shall not occur automatically upon operation of a device provided for charging condensers but must be accomplished by a separate manual operation. The method of firing shall be designed to insure no significant loss of charge from condensers during the firing process by inadvertent or deliberate action prior to the closing of the firing switch or contact(s).

(4) If battery-powered, the unit shall be so designed and constructed that the battery can be replaced without disturbing or damaging other electrical components.

§ 25.9 Conduct of investigations and demonstrations.

(a) Prior to the issuance of a certificate of approval, only necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon, may observe the investigations or tests. After the issuance of a certificate of approval, MSHA may conduct such public demonstrations and tests of the approved unit as it deems appropriate. The conduct of all investigations, tests, and demonstrations shall be under the direction and control of MSHA, and any other persons shall be present only as observers. MSHA shall hold as confidential and shall not disclose the results of chemical analyses of materials or the contents of the application and its accompanying drawings, specifications, and related materials.

[Schedule 16E, 25 FR 4645, May 26, 1960, as amended at 39 FR 24002, June 28, 1974]

§ 25.10 Certificate of approval.

(a) Upon the completion of the investigation MSHA shall issue to the applicant either a certificate of approval or a written notice of disapproval. If a certificate of approval is issued, no test data or detailed results of the test will accompany it. If the unit is disapproved, the notice of disapproval will be accompanied by details of the defects, with a view to possible correction. MSHA will hold as confidential the results of tests of units that are disapproved.

(b) Only formal written certificates of approval or notices of disapproval will be issued.

(c) A certificate of approval will be accompanied by a list of the drawings and specifications covering the details of design and construction upon which the approval is based, and with the official approval number marked thereon. Applicants shall keep exact duplicates of the drawings and specifications that have been submitted to MSHA and that relate to any unit which has received a certificate of approval, and these are to be adhered to exactly in production of the approved unit for commercial purposes.

§ 25.11 Approval plate.

(a) A certificate of approval will be accompanied by a photograph of a design for an approval plate, bearing the emblem of the Mine Safety and Health Administration, the name of the applicant, the class of unit to which the approval relates, and spaces for the approval number, the type, and serial number. When necessary, an appropriate statement of the precautions to be observed in maintaining the unit in an approved condition shall be added.

(b) The applicant shall reproduce the design on a stainless steel plate with the lettering etched or indented thereon. The size, type, method of attaching, and location of approval plates are subject to the approval of MSHA. The method of affixing the approval plate shall not impair any explosion-proof feature of the unit.

(c) The approval plate identifies the unit to which it is attached as permissible, and is the applicant's guarantee that the unit complies with the specifications and requirements in this part. Without an approval plate, no unit has the status of "permissible" under the provisions of this part.

(d) Use of the approval plate obligates the applicant to maintain the quality of each unit bearing it and guarantees that it is manufactured and assembled according to the drawings and specifications upon which a certificate of approval is based. Use of the approval plate is not authorized except on units that conform strictly with the drawings and specifications upon which the certificate of approval is based.

[Sched. 16E, 25 FR 4645, May 26, 1960, as amended at 43 FR 12315, Mar. 24, 1978]

§ 25.12 Changes after approval.

If an applicant desires to change any feature of an approved unit and still have it covered by an existing certificate of approval, he shall first obtain MSHA's approval of the change, pursuant to the following procedures:

(a) Application shall be made, as for an original certification, requesting that the existing certificate of approval be extended to cover the proposed change. The application shall be accompanied by drawings and specifications and related material as in the case of an original application.

(b) The application will be examined by MSHA to determine whether inspection and testing of the modified unit or any part thereof will be required. Generally, inspection and testing will be necessary if there is a possibility that the modification may affect adversely the performance of the unit. MSHA will inform the applicant whether such inspection and testing is required, the parts or materials to be submitted for that purpose, and the fee required.

(c) If the proposed modification meets the requirements and specifications of this part, a formal "extension of approval" will be issued accompanied by a list of new and corrected drawings and specifications to be added to those already on file as the basis for the certificate of approval.

§ 25.13 Withdrawal of approval.

MSHA reserves the right to rescind, for cause, at any time, any approval granted under this part.

Subpart B—Blasting Units Capable of Detonating 10 Short-Delay Electric Detonators

§ 25.20 Definition.

As used in this subpart: "Multiple-shot blasting unit" means that the unit is capable of consistently detonating not to exceed ten (10) short-delay electric detonators with a single application of electrical energy to the firing circuit, with the detonators connected in series, and with a total firing-circuit resistance of not less than 125 ohms.

§ 25.21 Specifications.

(a) The electrical energy applied to the firing circuit by the multiple-shot blasting unit shall be not less than 1.4 watt-seconds when the unit is operated according to the applicant's prescribed conditions of use, which shall be acceptable to MSHA.

(b) The difference of potential at the terminals of the multiple-shot blasting unit shall not exceed 375 volts.

Subpart C—Blasting Units Capable of Detonating 20 Short-Delay Electric Detonators

§ 25.25 Definition.

As used in this subpart:

"Multiple-shot blasting unit" means that the unit is capable of consistently detonating not to exceed twenty (20) short-delay electric detonators with a single application of electrical energy to the firing circuit, with the detonators connected in series, and with a total firing-circuit resistance of not less than 150 ohms.

§ 25.26 Specifications.

(a) The electrical energy applied to the firing circuit by the multiple-shot blasting unit shall be not less than 1.7 watt-seconds when the unit is operated according to the applicant's prescribed conditions of use, which shall be acceptable to MSHA.

(b) The difference of potential at the terminals of the multiple-shot blasting unit shall not exceed 400 volts.

PART 26—LIGHTING EQUIPMENT FOR ILLUMINATING UNDERGROUND WORKINGS

Sec.

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26.2 Definitions.
26.3 Consultation.
26.4 Type of equipment that may be granted certificates of approval for permissibility.
26.5 Components that may be certified.
26.6 Fees.
26.7 Tests and investigations.
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26.9 Specifications: all types of lighting systems.
26.10 Specifications: intrinsically safe lighting fixtures.
26.11 Specifications: explosion-proof lighting fixtures.
26.12 Specifications: cable connectors.
26.13 Specifications: portable cables.
26.14 Conduct of investigations and demonstrations.
26.15 Certificate of approval for permissibility.
26.16 Certification of components.
26.17 Approval plate for permissible lighting systems.
26.18 Markings for certified components.
26.19 Changes after certification.
26.20 Withdrawal of certification.

AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, secs. 201, 209, 212, 66 Stat. 692, 703, 709; 30 U.S.C. 3, 5, 7, 471, 479, 482; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961, and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: Schedule 29A, 23 FR 9479, Dec. 6, 1958, unless otherwise noted.

NOTE: Nomenclature changes to this part appear at 43 FR 12315, Mar. 24, 1978.

§ 26.1 Purpose.

The regulations in this part set forth the specifications and requirements for mine-lighting systems to procure their approval and certification as permissible for use in coal mines and certification of components for use in permissible lighting systems; procedures for applying for such certification; and fees.

§ 26.2 Definitions.

As used in this part:

(a) "Permissible," as applied to mine-lighting systems, means that the system conforms to the specifications and requirements of this part, and that a certificate of approval to that effect has been issued.

(b) "Certificate of approval for permissibility" means a formal document issued by MSHA stating that the system has met the specifications and requirements in this part and authorizing the use and attachment of an official approval plate.

(c) "Certification of components" means a statement in a letter of certification issued by MSHA that the components which are intended for use in permissible mine-lighting systems have satisfied all of the applicable requirements prescribed in this part.

(d) "Lighting system" means a complete assembly of all the components required to establish illumination, including the fixtures, wiring, connectors, circuit-protection devices, and any other related parts.

(e) "Incentive spark" means an electric spark or arc capable of igniting flammable methane-air mixtures.

(f) "Intrinsically safe" means a fixture, a combination of parts, or an electrical circuit that will not cause ignition of flammable methane-air mixtures in any normal operation, during an intended manipulation, or when accidentally broken, if properly installed and supplied by a voltage that does not vary excessively from the nominal rating. (For the purpose of this part, the definition may include, for example, certain types of fluorescent lamps which when broken will not cause ignition of flammable methane-air mixtures.)

(g) "Fixture circuit" means the circuit or wiring contained in the fixture enclosure.

(h) "Explosion-proof" means capable of withstanding internal explosions of methane-air mixtures without damage to the enclosure or discharge of flame. For detailed requirements see Part 18 of this subchapter (Schedule 2F).

(i) "Explosion resistant" means an enclosure not built to explosion-proof specifications but capable of withstanding internal explosions of methane-air mixtures without igniting surrounding explosive methane-air mixtures, and without damage to the enclosure.

(j) "Drip-proof" means so constructed or protected that the successful operation of a lighting fixture is not interfered with when it is subjected to falling moisture or dirt.

(k) "Distribution box" means a portable enclosure in which one or more portable cables may be connected to a common source of electrical energy.

(l) "Normal operation" means the performance of those functions for which the component was designed.

(m) "Portable cable" means a flexible cable by means of which a portable lighting system may be connected to a source of electrical energy.

(n) "Frame ground" means a connection through a separate conductor to all exposed metallic castings and other parts which will maintain the casings and components at ground potential.

(o) "Sectional unit" means a lighting fixture that may be added to or removed from a lighting circuit as work advances or retreats.

(p) "MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to March 9, 1978.

(q) "MSHA" means the United States Department of Labor, Mine Safety and Health Administration.

(r) "Applicant" means an individual, partnership, company, corporation, association, or other organization that designs, manufactures, or assembles, and seeks certification, or preliminary testing of a lighting system or its components.

[Schedule 29A, 23 FR 9479, Dec. 6, 1958, as amended at 39 FR 24002, June 28, 1974; 43 FR 12316, Mar. 24, 1978]

§ 26.3 Consultation.

By appointment, applicants or their representatives may visit Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W.Va. 26059 to discuss with qualified MSHA representatives proposed designs of equipment to be submitted in accordance with the requirements of the regulations of this part. No charge is made for such consultation.

[Sched. 29A, 23 FR 9479, Dec. 6, 1958, as amended at 43 FR 12316, Mar. 24, 1978]

§ 26.4 Type of equipment that may be granted certificates of approval for permissibility.

Certificates of approval for permissibility will be granted for completely assembled lighting systems only and not for individual parts or subassemblies. A certificate of approval for permissibility shall include all components, cables, and equipment used in other than fresh intake air, and also, necessary protective devices which may be housed in non-explosion-proof enclosures located in fresh intake air.

§ 26.5 Components that may be certified.

Manufacturers of components that are designed for use in permissible mine-lighting systems may request MSHA to issue a letter certifying to the suitability of components for such use. To qualify for certification, components shall have satisfactorily met the prescribed inspection and test requirements, and the construction thereof shall be adequately covered by specifications officially recorded and filed by MSHA.

§ 26.6 Fees.

(a) Detailed inspection	$105
(b) Explosion tests, each series	70
(c) Dropping test	30
(d) Temperature test	65
(e) High-potential test	40
(f) Safety tests in methane-air mixtures [1]	255
(g) Short-circuit test [1]	55
(h) Flame-resistance test (cable connectors)	50
(i) Final examination and recording of drawings and specifications requisite to issuing an approval	110

(j) Examining and recording drawings and specifications requisite to issuing an extension of approval	$70
(k) Tests to assist an applicant in evaluating equipment intended for certification may be made at the discretion of MSHA. Written requests for such tests shall be directed to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W.Va. 26059. A deposit of $200 shall be paid in advance when such tests have been authorized. The fees charged shall be in amounts proportionate to the work performed based on normal charges. Any surplus will be refunded at the completion of the work, or applied to future work, as directed by the applicant.	

[1] Applies to cable connectors submitted for certification.

[Sched. 29A, 30 FR 3756, Mar. 23, 1965, as amended at 43 FR 12316, Mar. 24, 1978]

§ 26.7 Tests and investigations.

Unless the application states otherwise, it will be presumed that a complete investigation for certification is desired. However, the application may be expressly limited to some element or phase less than a complete investigation. If the tests at any stage indicate that the lighting system does not conform to the specifications in this part, MSHA may treat the application as one for a partial investigation up to that point. Complete investigation for certification will not be undertaken unless the equipment has been fully developed, is ready to be marketed, and is submitted completely assembled, including parts, connectors, and all related materials.

§ 26.8 Applications.

(a) No investigation or testing will be undertaken by MSHA except pursuant to a written application, in duplicate, accompanied by a check, bank draft, or money order, payable to the U.S. Mine Safety and Health Administration to cover the fees, and all prescribed drawings, specifications, and related material. The application and all related matters and all correspondence concerning it shall be sent to Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W.Va. 26059.

(b) The equipment to be tested may be shipped (charges prepaid) at the same time the application is submitted, or, at the option of the applicant, shipment of the equipment may be deferred until MSHA has notified the applicant that the application will be accepted.

(c) Drawings and specifications shall be adequate in number and detail to identify fully the design of the device and to disclose its materials, detailed dimensions of all parts, and include a wiring diagram. Drawings must be numbered and dated to insure accurate identification and reference to records and must show the latest revision. Specifications must be given for materials, components, and subassemblies.

[Sched. 29A, 23 FR 9479, Dec. 6, 1958, as amended at 43 FR 12316, Mar. 24, 1978]

§ 26.9 Specifications; all types of lighting systems.

(a) MSHA will not test or investigate any lighting system that in its opinion is not constructed of suitable materials, that evidences faulty workmanship, or that is not designed upon sound engineering principles. In addition to any specifications or requirements imposed by the regulations in this part, MSHA may impose such further specifications or requirements as in its opinion are necessary or proper to investigate or test the particular device submitted.

(b) Adequacy of design and construction will be determined in connection with the following factors: Kind and durability of materials, test of active parts, resistance to moisture, drop test, insulation measurements, durability of construction, practicality in operation, suitability for underground service, and performance characteristics during the investigation. Since all possible designs, arrangements, or combinations cannot be foreseen, MSHA reserves the right to make any tests or to place any limitations on equipment or parts of equipment not specifically covered herein to determine the safety of such equipment with regard to explosion and fire hazards.

(c) The following types of lighting fixtures will be considered: (1) Intrinsically safe, and (2) explosion proof.

(d) All components must be designed and constructed in such a manner that they will not create an explosion or fire hazard.

(e) All enclosures must be essentially of "drip-proof" design.

(f) All fixtures and related components in a lighting system must be so designed that the temperature of external surfaces will not exceed 390° F. (200° C.) at any point during continual operation.

(g) No certificate of approval will be issued for a lighting system if the electrical pressure (difference of potential) of the power supply exceeds 300 volts direct current or 260 volts alternating current at the input terminals of any lighting fixture.

(h) The clearances between live parts and casings shall be such as to minimize the possibility of electric arcs between them, or if space is limited, the casing shall be lined with adequate insulation.

(i) Phenolic and other insulating materials that give off highly explosive gases when decomposed by heat, such as may be generated electrically, shall not be placed within enclosures where they might be subjected to destructive electrical arcing.

(j) All lighting circuits shall be provided with short-circuit protection. If distribution boxes are used for this purpose, they must conform with all of the applicable requirements of Part 18 of this subchapter (Schedule 2F) unless these distribution boxes are installed in fresh intake air. The circuit of each lighting fixture shall be protected against excessive overload currents.

(k) If an ungrounded system is used, which is electrically isolated from all other power circuits, fixtures and auxiliary equipment need not be frame grounded.

(l) If a grounded system is used, all cables must contain a separate grounding conductor to insure that all exposed conducting materials in the system will not exceed ground potential. A device that will disconnect all power from the system in case of a ground fault will meet this requirement.

(m) Power conductors must not be used for grounding.

(n) Lighting systems and fixtures shall be designed for hanging from supports, so that cables or components are not permitted to rest on the mine floor.

(o) All lighting fixtures must be provided with a lock or seal. Any other fastening that requires a special tool for its removal will be construed as an effective seal. In place of a conventional lock or seal, an electrical or mechanical interlock may be provided to prevent gaining access to the lamps with power on. Provision for removal of lamps without arcing or sparking will also be acceptable.

(p) Lighting fixtures must be so designed that vibration will not shake the lamps loose from their sockets or holders.

§ 26.10 Specifications; intrinsically safe lighting fixtures.

(a) Intrinsically safe lighting fixtures shall be so constructed that they will withstand being dropped five times from a height of five feet on an oak platform in the presence of explosive methane-air mixtures. (In these tests Pittsburgh natural gas may be substituted for methane.) The safety elements of the fixture must function so that no explosion or fire hazard exists at any time during or after the tests. (Breakage of a fluorescent lamp will not in itself constitute test failure.)

(b) The fixture must be enclosed in an explosion-resistant housing that will afford mechanical protection and withstand a minimum of ten internal explosion tests in surrounding explosive atmospheres containing air with 7.0 to 10.0 percent of methane without (1) igniting the surrounding atmosphere, or (2) permanently distorting of any part of the fixture.

(c) Plastic material used in place of glass for lighting fixtures must not create explosion, fire, or toxic hazards when subjected to normal maximum operating temperatures.

§ 26.11 Specifications; explosion-proof lighting fixtures.

(a) All lighting fixtures that cannot be designed instrinsically safe shall be constructed strictly in accordance with the applicable requirements of Part 18 of this subchapter (Schedule 2F).

(b) Transparent plastics used in place of glass shall be of the thickness required of glass and shall not crack or shatter when struck by dripping cold water.

§ 26.12 Specifications: cable connectors.

(a) Connectors shall be constructed so as to afford a minimum of accessibility to live electrodes by any means other than the related plug.

(b) The material of which cable connectors are made must be equivalent to the insulation on the cables with respect to flame-resistant properties.

(c) Cable connectors shall meet the following requirements:

(1) A connector designed for a nominal 240-volt system shall be engaged and disengaged through 750 cycles under its rated load at 260 volts alternating current at 80 percent power factor.

(2) A connector designed for a nominal 120-volt system shall be engaged and disengaged through 750 cycles under its rated load at 130 volts alternating current at 80 percent power factor.

NOTE: The tests described in paragraphs (c) (1) and (2) of this section will be performed mechanically in the presence of explosive atmospheres containing air with 7.0 to 10.0 percent of methane. Ignition of the surrounding explosive atmosphere, destructive burning, distortion, and excessive temperature constitute failure.

(3) Under normal load, no part of any cable connector shall attain a temperature in excess of 175°F. during any of the prescribed tests.

(4) At 260 volts impressed, one cable connector shall be subjected to a short-circuit test at the maximum capacity of a 5 KVA transformer. The connector components will be mechanically engaged with the cable on the male portion short circuited at the plug. A time lag fuse of the maximum current rating of the connector will be connected in the circuit.

NOTE: The connector used for this test will be one already subjected to the cycling test described in paragraphs (c) (1) and (2) of this section.

Fusing of the contacts will constitute a failure.

(d) Cable connectors must be so designed that they will withstand a pull of 25 pounds without separating subsequent to the cycling tests described in paragraph (c) (1) and (2) of this section.

§ 26.13 Specifications: portable cables.

(a) All portable cables shall have 600-volt insulation and shall have an outer jacket that is highly resistant to abrasion, moisture, and heat. They shall meet the flame-resistance requirements of Part 18 of this subchapter (Schedule 2F).

(b) The minimum conductor size acceptable for lighting circuits shall be No. 14 (AWG). In any case, cables must have conductors of a size equal to or greater than the National Electric Code standard. The current carrying capacity shall be based upon the maximum load that will be carried by the cables in normal service.

§ 26.14 Conduct of investigations and demonstrations.

Prior to the issuance of a certificate of approval, necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon, may observe the investigations or tests. After the issuance of a certificate of approval, MSHA may conduct such public demonstrations and tests of the approved system as it sees fit. The conduct of all investigations, tests, and demonstrations shall be under the sole direction and control of MSHA, and any other persons shall be present only as observers. MSHA shall hold as confidential and shall not disclose the results of chemical analyses of material or the contents of the application and its accompanying drawings, specifications, and related material.

[Schedule 29A, 23 FR 9479, Dec. 6, 1958, as amended at 39 FR 24002, June 28, 1974]

§ 26.15 Certificate of approval for permissibility.

(a) Upon completion of investigation of a lighting system, MSHA will issue to the applicant either a certificate of approval for permissibility or a written notice of disapproval, as the case may require. If a certificate of approval for permissibility is issued, no test data or detailed results of tests will accompany it. If a notice of disapproval is issued, it will be accompanied by details of the defects, with a view to possible correction. MSHA will hold as confidential results of tests that terminate in a notice of disapproval.

(b) A certificate of approval for permissibility will be accompanied by a list of the drawings and specifications covering the details of design and construction of the lighting system upon which the certificate is based, and with the official approval number marked thereon. Applicants shall keep exact duplicates of the drawings and specifications that have been submitted to MSHA and that relate to any system which has received a certificate of approval, and these are to be adhered to exactly in production of the approved system for commercial purposes.

§ 26.16 Certification of components.

(a) Upon completion of investigation of a component intended for use in a permissible lighting system, MSHA will issue a letter of certification to the applicant, or a written notice of disapproval, as the case may require. If a letter of certification is issued, no test data or detailed results of tests will accompany it. If a notice of disapproval is issued, it will be accompanied by details of the defects, with a view to possible correction. MSHA will hold as confidential results of tests that terminate in a notice of disapproval.

(b) Letters certifying components may be cited to manufacturers or assemblers of permissible lighting systems as evidence that further inspection and tests of the components will not be required, provided they are constructed strictly in accordance with the specifications on file with MSHA. Such letters will specify a MSHA file number to be used in marketing a certified component, as indicated in paragraph (a) of § 26.18. Since MSHA does not issue certificates of approval for permissibility except as applying to complete lighting systems, no person shall advertise or label components in a manner indicating that such components are certified as approved for permissibility by MSHA. Certified components may be advertised as suitable for application in permissible lighting systems.

§ 26.17 Approval plate for permissible lighting systems.

(a) A certificate of approval for permissibility will be accompanied by a photograph of a design for an approval plate, bearing the emblem of the Mine Safety and Health Administration, space for the approval number, the type, the serial number, the class of device to which the approval relates, and the name of the applicant. When deemed necessary by MSHA, an appropriate statement of the precautions to be observed in maintaining the system in an approved condition shall be added.

(b) The applicant shall reproduce the design either as a separate plate or by stamping or molding it in some suitable place on each lighting fixture of a certified system. The size, type, method of attaching and location of approval plates are subject to the approval of MSHA. The method of affixing the plate shall not impair the explosion-proof or explosion-resistant features of any enclosure.

(c) The approval plate identifies the lighting system as permissible, and is the applicant's guarantee that the system complies with the specifications and requirements in this part. Without an approval plate, no lighting system is considered "permissible" under the provisions of this part.

(d) Use of the approval plate obligates the applicant to maintain the quality of the system which bears it, and guarantees that it is manufactured and assembled according to the drawings and specifications upon which a certificate of approval was based. Use of the approval plate is not authorized except on systems that conform strictly with the drawings and specifications upon which the certificate of approval was based.

[Sched. 29A, 23 FR 9479, Dec. 6, 1958, as amended at 43 FR 12316, Mar. 24, 1978]

§ 26.18 Markings for certified components.

(a) Certified components shall bear permanent markings satisfactory to MSHA and shall contain the following:

Certified ____________________
(Name of component)
MSHA File No ____________________

Rating or caution statement, whichever is applicable.

(b) Use of such markings obligates the applicant to maintain the quality of each component bearing it and guarantees that it is manufactured and assembled according to the drawings and specifications upon which certification was based. Use of such markings is not authorized except on components that conform strictly with the drawings and specifications upon which certification was based.

§ 26.19 Changes after certification.

If an applicant desires to change any feature of a certified system or component and have it covered by existing certification, he shall first obtain MSHA's approval of the change, pursuant to the following procedures:

(a) Application shall be made, as for an original certification, requesting that the existing certification be extended to cover the proposed change. The application shall be accompanied by drawings and specifications and related material as in the case of an original application.

(b) The application will be examined by MSHA to determine whether inspection and testing of the modified system or component will be required. Generally, inspection and testing will be necessary if there is a possibility that the modification may affect adversely the performance of the system or component. MSHA will inform the applicant whether such inspection and testing is required, the parts or materials to be submitted for that purpose, and the fee.

(c) If the proposed modification meets the requirements and specifications of this part, a formal extension of the certification will be issued accompanied by a list of new and corrected drawings and specifications to be added to those already on file as the basis for the certificate.

§ 26.20 Withdrawal of certification.

MSHA reserves the right to rescind for cause, at any time, any certification granted under this part.

PART 27—METHANE-MONITORING SYSTEMS

Subpart A—General Provisions

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AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, secs. 201, 209, 212(a), 66 Stat. 692, 703, 709; 30 U.S.C. 3, 5, 7, 471, 479, 482(a); secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961, and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: 31 FR 10607, Aug. 9, 1966, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12316, Mar. 24, 1978.

Subpart A—General Provisions

§ 27.1 Purpose.

The regulations in this part set forth the requirements for methane-monitoring systems or components thereof to procure certification for their incorporation in or with permissible equipment that is used in gassy mines, tunnels, or other underground workings; procedures for applying for such certification; and fees.

§ 27.2 Definitions.

As used in this part:

(a) "MSHA" means the United States Department of Labor, Mine Safety and Health Administration.

(b) "Applicant" means an individual, partnership, company, corporation, association, or other organization that designs, manufactures, or assembles and that seeks certification or preliminary testing of a methane-monitoring system or component.

(c) "Methane-monitoring system" means a complete assembly of one or more methane detectors and all other components required for measuring and signalling the presence of methane in the atmosphere of a mine, tunnel, or other underground workings, and shall include a power-shutoff component.

(d) "Methane detector" means a component for a methane-monitoring system that functions in a gassy mine, tunnel, or other underground workings to sample the atmosphere continuously and responds to the presence of methane.

(e) "Power-shutoff component" means a component of a methane-monitoring system, such as a relay, switch, or switching mechanism, that will cause a control circuit to deenergize a machine, equipment, or power circuit when actuated by the methane detector.

(f) "Flammable mixture" means a mixture of a gas, such as methane, natural gas, or similar hydrocarbon gas with normal air, that can be ignited.

(g) "Gassy mine or tunnel" means a mine, tunnel, or other underground workings in which a flammable mixture has been ignited, or has been found with a permissible flame safety lamp, or has been determined by air analysis to contain 0.25 percent or more (by volume) of methane in any open workings when tested at a point not less than 12 inches from the roof, face, or rib.

(h) "Letter of certification" means a formal document issued by MSHA stating that a methane-monitoring system or subassembly or component thereof: (1) Has met the requirements of this part, and (2) is certified for incorporation in or with permissible or approved equipment that is used in gassy mines and tunnels.

(i) "Component" means a part of a methane-monitoring system that is essential to its operation as a certified methane-monitoring system.

(j) "Explosion-proof" means that a component or group of components (subassembly) is so constructed and protected by an enclosure with or without a flame arrester(s) that, if a flammable mixture of gas is ignited within the enclosure, it will withstand the resultant pressure without damage to the enclosure and/or flame arrester(s). Also the enclosure and/or flame arrester(s) shall prevent the discharge of flame from within either the enclosure or the flame arrester, or the ignition of any flammable mixture that surrounds the enclosure and/or flame arrester.[1]

(k) "Normal operation" means that performance of each component as well as of the entire assembly of the methane-monitoring system is in conformance with the functions for which it was designed and for which it was tested by MSHA.

(l) "Flame arrester" means a device so constructed that it will prevent propagation of flame or explosion from within the unit of which it is part to a surrounding flammable mixture.

(m) "Intrinsically safe equipment and circuitry" means equipment and circuitry that are incapable of releas-

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[1] Explosion-proof components or subassemblies shall be constructed in accordance with the requirements of Part 18 of this subchapter.

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ing enough electrical or thermal energy under normal or abnormal conditions to cause ignition of a flammable mixture of the most easily ignitable composition.

(n) "Fail safe" means that the circuitry of a methane-monitoring system shall be so designed that electrical failure of a component which is critical in MSHA's opinion will result in deenergizing the methane-monitoring system and the machine or equipment of which it is a part.

[31 FR 10607, Aug. 9, 1966, as amended at 39 FR 24003, June 28, 1974; 43 FR 12316, Mar. 24, 1978]

§ 27.3 Consultation.

By appointment, applicants or their representatives may visit Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 to discuss with qualified MSHA personnel proposed methane-monitoring systems to be submitted in accordance with the regulations of this part. No charge is made for such consultation and no written report thereof will be made to the applicant.

[31 FR 10607, Aug. 9, 1966, as amended at 43 FR 12316, Mar. 24, 1978]

§ 27.4 Applications.

(a) No investigation or testing for certification will be undertaken by MSHA except pursuant to a written application, in duplicate, accompanied by all drawings, specifications, descriptions, and related materials and also a check, bank draft, or money order, payable to U.S. Mine Safety and Health Administration, to cover the fees. The application and all related matters and correspondence concerning it shall be addressed to Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059.

(b) Drawings, specifications, and descriptions shall be adequate in detail to identify fully all components and subassemblies that are submitted for investigation, and shall include wiring and block diagrams. All drawings shall include title, number, and date; any revision dates and the purpose of each revision shall also be shown on the drawing.

(c) For a complete investigation leading to certification, the applicant shall furnish all necessary components and material to MSHA. MSHA reserves the right to require more than one of each component, subassembly, or assembly for the investigation. Spare parts and expendable components, subject to wear in normal operation, shall be supplied by the applicant to permit continuous operation during test periods. The applicant shall furnish special tools necessary to assemble or disassemble any component or subassembly for inspection or test.

(d) The applicant shall submit a plan of inspection of components at the place of manufacture or assembly. The applicant shall furnish to MSHA a copy of any factory-inspection form or equivalent with the application. The form shall direct attention to the points that must be checked to make certain that all components or subassemblies of the complete assembly are in proper condition, complete in all respects, and in agreement with the drawings, specifications, and descriptions filed with MSHA.

(e) The applicant shall furnish to MSHA complete instructions for operating the assembly and servicing components. After completion of MSHA's investigation, and before certification, if any revision of the instructions is required, a revised copy thereof shall be submitted to MSHA for inclusion with the drawings and specifications.

[31 FR 10607, Aug. 9, 1966, as amended at 43 FR 12316, Mar. 24, 1978]

§ 27.5 Letter of certification.

(a) Upon completion of investigation of a methane-monitoring system, or component or subassembly thereof, MSHA will issue to the applicant either a letter of certification or a written notice of disapproval, as the case may require If a letter of certification is issued, no test data or detailed results of tests will accompany it. If a notice of disapproval is issued, it will be accompanied by details of the defects, with a view to possible correction. MSHA will not disclose except to the applicant or his authorized representative, any information because of which a notice of disapproval has been issued.

(b) A letter of certification will be accompanied by an appropriate cautionary statement specifying the conditions to be observed for operating and maintaining the device(s) and to preserve its certified status.

§ 27.6 Certification of components.

In accordance with § 27.4, manufacturers of components may apply to MSHA to issue a letter of certification. To qualify for certification, electrical components shall conform to the prescribed inspection and test requirements and the construction thereof shall be adequately covered by specifications officially recorded and filed with MSHA. Letters of certification may be cited to fabricators of equipment intended for use in a certified methane-monitoring system as evidence that further inspection and test of the components will not be required.

§ 27.7 Certification plate or label.

A certified methane-monitoring system or component thereof shall be identified with a certification plate or label which is attached to the system or component in a manner acceptable to MSHA. The method of attachment shall not impair the explosion-proof characteristics of any enclosure. The plate or label shall be of serviceable material, acceptable to MSHA, and shall contain the following inscription with spaces for appropriate identification of the system or component and assigned certificate number:

Manufacturer's Name ——————————
Description ———————————————
(Name)
Model or Type No ——————————
Certified as complying with the applicable requirements of Schedule 32A. ————
Certificate No ——————————————

§ 27.8 Fees.

(a) Detailed inspection—each assembled component	$60
(b) Explosion testing—each explosion-proof enclosure	70
(c) Each series of tests to determine adequacy of design, materials, and/or construction	105
(d) Tests to determine safe operation and performance of a complete methane-monitoring system	$200
(e) Tests to determine intrinsic safety	105
(f) Final examination and recording of drawings and specifications requisite to issuing a letter of certification	110
(g) Examining and recording drawings and specifications requisite to issuing an extension of certification, each 4 hours or fraction thereof	35
(h) Tests to assist an applicant in evaluating equipment intended for certification may be made at the discretion of MSHA. Written requests for such tests shall be directed to Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. A deposit of $200 shall be paid in advance when such tests have been authorized. The fees charged shall depend on the work performed based on normal charges. Any surplus will be refunded at the completion of the work, or applied to future work, on the same device, as directed by the applicant.	

If an applicant is unable to determine the exact fee that should be submitted with his application, the information will be provided upon request addressed to Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. Any surplus from a fee submitted in excess of requirements will be refunded to the applicant upon completion or termination of the investigation or tests.

[31 FR 10607, Aug. 9, 1966, as amended at 43 FR 12316, Mar. 24, 1978]

§ 27.9 Date for conducting tests.

The application, payment of necessary fees, and submission of required material will determine the order of precedence for testing when more than one application is pending. The applicant will be notified of the date on which tests will begin.

NOTE: If an assembly, subassembly, or component fails to meet any of the requirements, testing of it may be suspended and other items may be tested. However, if the cause of failure is corrected, testing will be resumed after completing such other test work as may be in progress.

§ 27.10 Conduct of investigations, tests, and demonstrations.

MSHA shall hold as confidential and shall not disclose principles or patentable features, nor shall it disclose any details of drawings, specifications, or related materials. The conduct of all investigations, tests, and demonstrations shall be under the direction and control of MSHA, and any other persons shall be present only as observers, except as noted in paragraph (b) of this section.

(a) Prior to the issuance of a letter of certification, necessary Government personnel, representatives of the applicant, and such other persons as are mutually agreed upon may observe the investigations or tests.

(b) When requested by MSHA the applicant shall provide assistance in assembling or disassembling components, subassemblies, or assemblies for testing, preparing components, subassemblies, or assemblies for testing, and operating the system during the tests.

(c) After the issuance of a letter of certification, MSHA may conduct such public demonstrations and tests of the certified methane-monitoring system or components as it deems appropriate.

[31 FR 10607, Aug. 9, 1966, as amended at 39 FR 24003, June 28, 1974]

§ 27.11 Extension of certification.

If an applicant desires to change any feature of a certified system or component, he shall first obtain MSHA's approval of the change, pursuant to the following procedure:

(a) Application shall be made as for an original certification, requesting that the existing certification be extended to cover the proposed changes. The application shall include complete drawings, specifications, and related data, showing the changes in detail.

(b) The application will be examined by MSHA to determine whether inspection and testing of the modified system or component or of a part will be required. MSHA will inform the applicant whether testing is required; the component or components and related material to be submitted for that purpose; and the fee for testing.

(c) If the proposed modification meets the requirements of this part, a formal extension of certification will be issued, accompanied by a list of revised drawings and specifications which MSHA has added to those already on file.

§ 27.12 Withdrawal of certification.

MSHA reserves the right to rescind for cause any certification issued under this part.

Subpart B—Construction and Design Requirements

§ 27.20 Quality of material, workmanship, and design.

(a) MSHA will test only equipment that, in its opinion, is constructed of suitable materials, is of good workmanship, is based on sound engineering principles, and is safe for its intended use. Since all possible designs, arrangements, or combinations of components cannot be foreseen, MSHA reserves the right to modify the construction and design requirements of components or subassemblies and the tests to obtain the degree of protection intended by the tests described in Subpart C of this part.

(b) Unless otherwise noted, the requirements stated in this part shall apply to explosion-proof enclosures and intrinsically safe circuits.

(c) All components, subassemblies, and assemblies shall be designed and constructed in a manner that will not create an explosion or fire hazard.

(d) All assemblies or enclosures—explosion-proof or intrinsically safe—shall be so designed that the temperatures of the external surfaces, during continuous operation, do not exceed 150° C. (302° F.) at any point.

(e) Lenses or globes shall be protected against damage by guards or by location.

(f) If MSHA determines that an explosion hazard can be created by breakage of a bulb having an incandescent filament, the bulb mounting shall be so constructed that the bulb will be ejected if the bulb glass enclosing the filament is broken.

NOTE: Other methods that provide equivalent protection against explosion hazards from incandescent filaments may be considered satisfactory at the discretion of MSHA.

§ 27.21 Methane-monitoring system.

(a) A methane-monitoring system shall be so designed that any machine or equipment, which is controlled by the system, cannot be operated unless the electrical components of the methane-monitoring system are functioning normally.

(b) A methane-monitoring system shall be rugged in construction so that its operation will not be affected by vibration or physical shock, such as normally encountered in mining operations.

(c) Insulating materials that give off flammable or explosive gases when decomposed shall not be used within enclosures where they might be subjected to destructive electrical action.

(d) An enclosure shall be equipped with a lock, seal, or acceptable equivalent when MSHA deems such protection necessary for safety.

(e) A component or subassembly of a methane-monitoring system shall be constructed as a package unit or otherwise in a manner acceptable to MSHA. Such components or subassemblies shall be readily replaceable or removable without creating an ignition hazard.

(f) The complete system shall "fail safe" in a manner acceptable to MSHA.

§ 27.22 Methane detector component.

(a) A methane detector component shall be suitably constructed for incorporation in or with permissible and approved equipment that is operated in gassy mines and tunnels.

(b) A methane detector shall include:

(1) A method of continuous sampling of the atmosphere in which it functions.

(2) A method for actuating a warning device which shall function automatically at a methane content of the mine atmosphere between 1.0 to 1.5 volume percent. The warning device shall also function automatically at all higher concentrations of methane in the mine atmosphere.

(3) A method for actuating a power-shutoff component, which shall function automatically when the methane content of the mine atmosphere is 2.0 volume percent and at all higher concentrations of methane.

(4) A suitable filter on the sampling intake to prevent dust and moisture from entering and interfering with normal operation.

NOTE: This requirement for the methane detector may be waived if the design is such as to preclude the need of a filter.

(c) A methane detector may provide means for sampling at more than one point; provided, the methane detector shall separately detect the methane in the atmosphere at each sampling point with, in MSHA's opinion, sufficient frequency.

§ 27.23 Automatic warning device.

(a) An automatic warning device shall be suitably constructed for incorporation in or with permissible and approved equipment that is operated in gassy mines and tunnels.

(b) An automatic warning device shall include an alarm signal (audible or colored light), which shall be made to function automatically at a methane content of the mine atmosphere between 1.0 to 1.5 volume percent and at all higher concentrations of methane.

(c) It is recommended that the automatic warning device be supplemented by a meter calibrated in volume percent of methane.

§ 27.24 Power-shutoff component.

(a) A power-shutoff component shall be suitably constructed for incorporation in or with permissible and approved equipment that is operated in gassy mines and tunnels.

(b) The power-shutoff component shall include:

(1) A means which shall be made to function automatically to deenergize the machine or equipment when actuated by the methane detector at a methane concentration of 2.0 volume percent and at all higher concentrations in the mine atmosphere.

(i) For an electric-powered machine or equipment energized by means of a trailing cable, the power-shutoff component shall, when actuated by the methane detector, cause a control circuit to shut down the machine or equipment on which it is installed; or it shall cause a control circuit to deenergize both the machine or equipment and the trailing cable.

NOTE: It is not necessary that power be controlled both at the machine and at the outby end of the trailing cable.

(ii) For a battery-powered machine or equipment, the methane-monitor power-shutoff component shall, when actuated by the methane detector, cause a control circuit to deenergize the machine or equipment as near as possible to the battery terminals.

(iii) For a diesel-powered machine or equipment, the power-shutoff component, when actuated by the methane detector, shall shut down the prime mover and deenergize all electrical components of the machine or equipment. Batteries are to be disconnected as near as possible to the battery terminals. Headlights which are approved under Part 20 of this subchapter (Schedule 10, or any revision thereof) are specifically exempted from this requirement.

(2) An arrangement for testing the power-shutoff characteristic to determine whether the power-shutoff component is functioning properly.

Subpart C—Test Requirements

§ 27.30 Inspection.

A detailed inspection shall be made by MSHA of the equipment and all components and functions related to safety in operation, which shall include:

(a) Examining materials, workmanship, and design to determine conformance with paragraph (a) of § 27.20.

(b) Comparing components and subassemblies with the drawings and specifications to verify conformance with the requirements of this part.

§ 27.31 Testing methods.

A methane-monitoring system shall be tested by MSHA to determine its functional performance, and its explosion-proof and other safety characteristics. Since all possible designs, arrangements, or combinations cannot be foreseen, MSHA reserves the right to make any tests or to place any limitations on equipment, or components or subassemblies thereof, not specifically covered herein, to determine and assure the safety of such equipment with regard to explosion and fire hazards.

§ 27.32 Tests to determine performance of the system.

(a) *Laboratory tests for reliability and durability.* Five hundred successful consecutive tests[2] for gas detection, alarm action, and power shutoff in natural gas-air mixtures[3] shall be conducted to demonstrate acceptable performance as to reliability and durability of a methane-monitoring system. The tests shall be conducted as follows:

(1) The methane detector component shall be placed in a test gallery into which natural gas shall be made to enter at various rates with sufficient turbulence for proper mixing with the air in the gallery. To comply with the requirements of this test, the detector shall provide an impulse to actuate an alarm at a predetermined percentage of gas and also provide an impulse to actuate a power shutoff at a second predetermined percentage of gas. (See §§ 27.21, 27.22, 27.23, and 27.24.)[4]

(b) *Field tests.* MSHA reserves the right to conduct tests, similar to those stated in paragraph (a) of this section, in underground workings to verify reliability and durability of a methane-monitoring system installed in connection with a piece of mining equipment.

§ 27.33 Test to determine explosion-proof construction.

Any assembly, subassembly, or component which, in the opinion of MSHA, requires explosion-proof construction shall be tested in accordance with the procedures stated in Part 18 of this subchapter.

§ 27.34 Test for intrinsic safety.

Assemblies, subassemblies, or components that are designed for intrinsic safety shall be tested by introducing into the circuit(s) thereof a circuit-interrupting device which produces an electric spark from the current in the circuit. The circuit-interrupting device shall be placed in a gallery containing various flammable natural gas-air mixtures. To meet the requirements of this test, the spark shall not ignite the flammable mixture. For this test the circuit-interrupting device shall be operated not less than 100 times at 125 percent of the normal operating voltage of the particular circuit.

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[2] Normal replacements and adjustments shall not constitute a failure.

[3] Investigation has shown that, for practical purposes, natural gas (containing a high percentage of methane) is a satisfactory substitute for pure methane in these tests.

[4] At the option of MSHA, these tests will be conducted with dust or moisture added to the atmosphere within the gallery.

§ 27.35 Tests to determine life of critical components and subassemblies.

Replaceable components may be subjected to appropriate life tests at the discretion of MSHA.

§ 27.36 Test for adequacy of electrical insulation and clearances.

MSHA shall examine, and test in a manner it deems suitable, electrical insulation and clearances between electrical conductors to determine adequacy for the intended service.

§ 27.37 Tests to determine adequacy of safety devices for bulbs.

The glass envelope of bulbs with the filament incandescent at normal operating voltage shall be broken in flammable methane-air or natural gas-air mixtures in a gallery to determine that the safety device will prevent ignition of the flammable mixtures.

§ 27.38 Tests to determine adequacy of windows and lenses.

Impact tests. A 4-pound cylindrical weight with a one-inch diameter hemispherical striking surface will be dropped (free fall) to strike the window or lens in its mounting or the equivalent thereof at or near the center. At least three out of four samples shall withstand the impact according to the following table:

Overall lens diameter (inches)	Height of fall (inches)
Less than 4	6
4 to 5	9
5 to 6	15
Greater than 6	24

Lenses or windows of smaller diameter than 1 inch may be tested by alternate methods at the discretion of MSHA.

§ 27.39 Tests to determine resistance to vibration.

(a) *Laboratory tests for reliability and durability.* Components, subassemblies, or assemblies that are to be mounted on permissible and approved equipment shall be subjected to two separate vibration tests, each of one-hour duration. The first test shall be conducted at a frequency of 30 cycles per second with a total movement per cycle of 1/16-inch. The second test shall be conducted at a frequency of 15 cycles per second with a total movement per cycle of 1/8-inch. Components, subassemblies, and assemblies shall be secured to the vibration testing equipment in their normal operating positions (with shock mounts, if regularly provided with shock mounts). Each component, subassembly and assembly shall function normally during and after each vibration test.

NOTE: The vibrating equipment is designed to impart a circular motion in a plane inclined 45° to the vertical or horizontal.

(b) *Field tests.* MSHA reserves the right to conduct tests to determine resistance to vibration in underground workings to verify the reliability and durability of a methane-monitoring system or component(s) thereof where installed in connection with a piece of mining equipment.

§ 27.40 Test to determine resistance to dust.

Components, subassemblies, or assemblies, the normal functioning of which might be affected by dust, such as coal or rock dust, shall be tested in an atmosphere containing an average concentration (50 million minus 40 micron particles per cubic foot) of such dust(s) for a continuous period of 4 hours. The component, subassembly, or assembly shall function normally after being subjected to this test.

NOTE: Dust measurements, when necessary, shall be made by impinger sampling and light-field counting technique.

§ 27.41 **Test to determine resistance to moisture.**

Components, subassemblies, or assemblies, the normal functioning of which might be affected by moisture, shall be tested in atmospheres of high relative humidity (80 percent or more at 65–75 F.) for continuous operating and idle periods of 4 hours each. The component or subassembly or assembly shall function normally after being subjected to those tests.

PART 28—FUSES FOR USE WITH DIRECT CURRENT IN PROVIDING SHORT-CIRCUIT PROTECTION FOR TRAILING CABLES IN COAL MINES

Subpart A—General Provisions

Sec.
28.1 Purpose.
28.2 Approved fuses.
28.3 Installation, use, and maintenance of approved fuses.
28.4 Definitions.

Subpart B—Application for Approval

28.10 Application procedures.

Subpart C—Approval and Disapproval

28.20 Certificates of approval; scope of approval.
28.21 Certificates of approval; contents.
28.22 Notice of disapproval.
28.23 Approval labels or markings; approval of contents; use.
28.24 Revocation of certificates of approval.
28.25 Changes or modifications of approved fuses; issuance of modification of certificate of approval.

Subpart D—Quality Control

28.30 Quality control plans; filing requirements.
28.31 Quality control plans; contents.
28.32 Proposed quality control plans; approval by MSHA.
28.33 Quality control test methods, equipment, and records; review by MSHA; revocation of approval.

Subpart E—Construction, Performance and Testing Requirements

28.40 Construction and performance requirements; general.
28.41 Testing requirements; general.

AUTHORITY: Secs. 306(b) and 508 of the Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. 801, 83 Stat. 742), and 36 Stat. 369, as amended, 37 Stat. 681, 30 U.S.C. 3, 5, and 7; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-73 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: 37 FR 7562, Apr. 15, 1972, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12316, Mar. 24, 1978.

Subpart A—General Provisions

§ 28.1 **Purpose.**

The purpose of the regulations contained in this Part 28 is: (a) To establish procedures and prescribe requirements which must be met in filing applications for the approval of fuses for use with direct current in providing short-circuit protection for trailing cables in coal mines, or the approval of changes or modifications of approved fuses; (b) to specify minimum performance requirements and to prescribe methods to be employed in conducting inspections, examinations, and tests to determine the effectiveness of fuses for use with direct current in providing short-circuit protection for trailing cables in coal mines; and (c) to provide for the issuance of certificates of approval or modifications of certificates of approval for fuses which have met the minimum requirements for performance and short-circuit protection set forth in this part.

§ 28.2 **Approved fuses.**

(a) On and after the effective date of this part, fuses shall be considered to be approved for use with direct current in providing short-circuit protection for trailing cables in coal mines only where such fuses are: (1) The same in all respects as those fuses which have been approved after meeting the minimum requirements for performance and short-circuit protection prescribed in this Part 28; and (2) maintained in an approved condition.

§ 28.3 Installation, use, and maintenance of approved fuses.

Approved fuses shall be installed and maintained in accordance with the specifications prescribed by the manufacturer of the fuses, and shall be selected and used in accordance with the standards prescribed for short-circuit protective devices for trailing cables in Parts 75 and 77, Subchapter O of this chapter.

§ 28.4 Definitions.

As used in this part—

(a) "Applicant" means an individual, partnership, company, corporation, association, or other organization that designs, manufactures, assembles, or fabricates, or controls the design, manufacture, assembly, or fabrication of a fuse, and who seeks to obtain a certificate of approval for such fuse.

(b) "Approval" means a certificate or formal document issued by MSHA stating that an individual fuse or combination of fuses has met the minimum requirements of this Part 28, and that the applicant is authorized to use and attach an approval label or other equivalent marking to any fuse manufactured, assembled, or fabricated in conformance with the plans and specifications upon which the approval was based, as evidence of such approval.

(c) "Approved" means conforming to the minimum requirements of this Part 28.

(d) "MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to March 9, 1978.

(e) "MSHA" means the United States Department of Labor, Mine Safety and Health Administration.

(f) "Fuse" means a device, no less effective than an automatic circuit breaker, for use with direct current which provides short-circuit protection for trailing cables in coal mines by interrupting an excessive current in the circuit.

[37 FR 7562, Apr. 15, 1972, as amended at 39 FR 24003, June 28, 1974; 43 FR 12316, Mar. 24, 1978]

Subpart B—Application for Approval

§ 28.10 Application procedures.

(a) Each applicant seeking approval of a fuse for use with direct current in providing short-circuit protection for trailing cables shall arrange for submission, at his own expense, of the number of fuses necessary for testing to Westinghouse Electric Corp., High Voltage Test Laboratory, East Pittsburgh, Pa. 15112, or General Electric Co., High Voltage Laboratory, 7500 Lindberg Boulevard, Philadelphia, PA 19155, or any other nationally recognized independent testing laboratory capable of performing the examination, inspection, and testing requirements of this part.

(b) The applicant shall insure, at his own expense, that the examination, inspection, and testing requirements of this part are properly and thoroughly performed by the independent testing laboratory of his choice.

(c) Upon satisfactory completion by the independent testing laboratory of the examination, inspection, and testing requirements of this part, the data and results of such examination, inspection, and tests shall be certified by both the applicant and the laboratory and shall be sent for evaluation of such data and results to Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059

(d) The certified data and results of the examinations, inspections, and tests required by this part and submitted to MSHA shall be accompanied by a check, bank draft, or money order in the amount of $55 for each fuse size and type payable to the order of the U.S. Mine Safety and Health Administration.

(e) The certified data and results of the examinations, inspections, and tests required by this part and submitted to MSHA for evaluation shall be accompanied by a proposed plan for quality control which meets the minimum requirements set forth in Subpart D of this part.

(f) Each applicant shall deliver to MSHA at his own expense, three fuses of each size and type which may be necessary for evaluation of the examination, inspection, and test results by the Bureau.

(g) Applicants or their representatives may visit or communicate with Approval and Certification Center in order to discuss the requirements for approval of any fuse, or to obtain criticism of proposed designs; no charge shall be made for such consultation and no written report shall be issued by MSHA as a result of such consultation.

[37 FR 7562, Apr. 15, 1972, as amended at 43 FR 12316, Mar. 24, 1978]

Subpart C—Approval and Disapproval

§ 28.20 Certificates of approval; scope of approval.

(a) MSHA shall issue certificates of approval pursuant to the provisions of this subpart only for individual, completely fabricated fuses which have been examined, inspected, and tested as specified in § 28.10, and have been evaluated by MSHA to ensure that they meet the minimum requirements prescribed in this part.

(b) MSHA shall not issue an informal notification of approval.

§ 28.21 Certificates of approval; contents.

(a) Each certificate of approval shall contain a description of the fuse and a classification of its current-interrupting capacity and current rating.

(b) The certificate of approval shall specifically set forth any restrictions or limitations on the use of the fuse in providing short-circuit protection for trailing cables.

(c) Each certificate of approval shall be accompanied by a reproduction of the approval label or marking design, as appropriate, to be employed by the applicant with each approved fuse as provided in § 28.23.

(d) No test data or specific laboratory findings will accompany any certificate of approval; however, MSHA will release analyses of pertinent test data and specific findings upon receipt of a written request by the applicant, or when required by statute or regulation.

(e) Each certificate of approval shall also contain the approved quality control plan as specified in § 28.31.

§ 28.22 Notice of disapproval.

(a) If, upon completion of the evaluation by MSHA conducted in accordance with § 28.10, it is determined that the fuse does not meet the minimum requirements set forth in this part, MSHA shall issue a written notice of disapproval to the applicant.

(b) Each notice of disapproval shall be accompanied by all available findings with respect to the defects of the fuse for which approval was sought with a view to the possible correction of any such defects.

(c) MSHA shall not disclose, except to the applicant upon written request or when required by statute or regulation, any data, findings, or other information with respect to any fuse for which a notice of disapproval is issued.

§ 28.23 Approval labels or markings; approval of contents; use.

(a) Approval labels shall bear the emblem of the Mine Safety and Health Administration, an approval number, the restrictions, if any, placed upon the use of the fuse by MSHA, and where appropriate, the applicant's name and address.

(b) Upon receipt of a certificate of approval, the applicant shall submit to MSHA, for approval of contents, full-scale reproductions of approval labels or markings, as appropriate, and a sketch or description of the method of application and position on the fuse, together with instructions for the installation, use, and maintenance of the fuse.

(c) Legible reproductions or abbreviated forms of the label or markings approved by MSHA shall be attached to or printed on each fuse.

(d) Each fuse shall be marked with the rating of the Underwriters Laboratories, Inc.

(e) MSHA shall, where necessary, notify the applicant when additional labels, markings, or instructions will be required.

(f) Approval labels or markings shall only be used by the applicant to whom they were issued.

(g) The use of any MSHA approval label or marking obligates the applicant to whom it is issued to maintain or cause to be maintained the approved quality control sampling procedure and the acceptable quality level for each characteristic tested, and to guarantee that the approved fuse is manufactured according to the specifications upon which the certificate of approval is based.

(h) The use of any MSHA approval label or marking obligates the applicant to whom it is issued to retest the approved fuse within a 2-year period from the date of the certificate of approval, and every 2 years thereafter, in accordance with the provisions of § 28.10.

[37 FR 7562, Apr. 15, 1972, as amended at 43 FR 12316, Mar. 24, 1978; 45 FR 68935, Oct. 17, 1980]

§ 28.24 Revocation of certificates of approval.

MSHA reserves the right to revoke, for cause, any certificate of approval issued pursuant to the provisions of this part. Such causes include, but are not limited to, misuse of approval labels and markings, misleading advertising, violations of section 110(h) of the Federal Mine Safety and Health Act of 1977 and failure to maintain or cause to be maintained the quality control requirements of the certificate of approval.

[37 FR 7562, Apr. 15, 1972, as amended at 43 FR 12316, Mar. 24, 1978]

§ 28.25 Changes or modifications of approved fuses; issuance of modification of certificate of approval.

(a) Each applicant may, if he desires to change any feature of an approved fuse, request a modification of the original certificate of approval issued by MSHA for such fuse by filing an application for modification in accordance with the provisions of this section.

(b) Applications, including fees, shall be submitted as specified in § 28.10 for an original certificate of approval, with a request for a modification of the existing certificate to cover any proposed change.

(c) The application for modification, together with the examination, inspection, and test results prescribed by § 28.10 shall be examined and evaluated by MSHA to determine if the proposed modification meets the requirements of this part.

(d) If the proposed modification meets the requirements of this part, a formal modification of approval will be issued, accompanied, where necessary, by reproductions of revised approval labels or markings.

Subpart D—Quality Control

§ 28.30 Quality control plans; filing requirements.

As a part of each application for approval or modification of approval submitted pursuant to this part, each applicant shall file with MSHA a proposed quality control plan which shall be designed to assure the quality of short-circuit protection provided by the fuse for which approval is sought.

§ 28.31 Quality control plans; contents.

(a) Each quality control plan shall contain provisions for the management of quality, including: (1) Requirements for the production of quality data and the use of quality control records; (2) control of engineering drawings, documentations, and changes; (3) control and calibration of measuring and test equipment; (4) control of purchased material to include incoming inspection; (5) lot identification, control of processes, manufacturing, fabrication, and assembly work conducted in the applicant's plant; (6) audit or final inspection of the completed product; and, (7) the organizational structure necessary to carry out these provisions.

(b) The sampling plan shall include inspection tests and sampling procedures developed in accordance with Military Specification MIL-F-15160D, "Fuses; Instrument, Power, and Telephone" (which is hereby incorporated by reference and made a part hereof), Group A tests and Group B tests, except that the continuity and/or resistance characteristics of each fuse shall be tested. Military Specification MIL-F-15160D is available for examination at Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. Copies of the document may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

(c) The sampling procedure shall include a list of the characteristics to be tested by the applicant or his agent and shall include but not be limited to: (1) Continuity and/or resistance determination for each fuse; (2) carry current capability (not less than 110 percent of the rated current); and, (3) overload current interruption capability (not less than 135 percent of the rated current).

(d) The quality control inspection test method to be used by the applicant or his agent for each characteristic required to be tested shall be described in detail.

[37 FR 7562, Apr. 15, 1972, as amended at 43 FR 12316, Mar. 24, 1978]

§ 28.32 Proposed quality control plans; approval by MSHA.

(a) Each proposed quality control plan submitted in accordance with this subpart shall be reviewed by MSHA to determine its effectiveness in insuring the quality of short-circuit protection provided by the fuse for which an approval is sought.

(b) If MSHA determines that the proposed quality control plan submitted by the applicant will not insure adequate quality control, MSHA shall require the applicant to modify the procedures and testing requirements of the plan prior to approval of the plan and issuance of any certificate of approval.

(c) Approved quality control plans shall constitute a part of and be incorporated into any certificate of approval issued by MSHA, and compliance with such plans by the applicant shall be a condition of approval.

§ 28.33 Quality control test methods, equipment, and records; review by MSHA; revocation of approval.

(a) MSHA reserves the right to have its representatives inspect the applicant's quality control test methods, equipment, and records, and to interview any employee or agent of the applicant in regard to quality control test methods, equipment, and records.

(b) MSHA reserves the right to revoke, for cause, any certificate of approval where it finds that the applicant's quality control test methods, equipment, or records do not ensure effective quality control over the fuse for which the approval was issued.

Subpart E—Construction, Performance, and Testing Requirements

§ 28.40 Construction and performance requirements; general.

(a) MSHA shall issue approvals for fuses for use with direct current in providing short-circuit protection for trailing cables, when such fuses have met the minimum construction, performance, and testing requirements set forth in this subpart.

(b) Fuses submitted to MSHA for approval will not be accepted unless they are designed on sound engineering and scientific principles, constructed of suitable materials, and evidence good workmanship.

(c) Fuses may be single-element or dual-element in type, however, they shall be capable of interrupting any direct current within a range from the ampere rating of the fuse under consideration for approval up to 20,000 amperes.

(d) MSHA shall accept the fuse size and ampere rating as specified in the Underwriters Laboratories, Inc., standard for alternating current fuses (UL-198), which is hereby incorporated by reference and made a part hereof. This document is available for examination at Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, and copies of the document are available from Underwriter's Laboratories, Inc., 161 Sixth Avenue, New York, NY 10013.

(e) Fuses shall be capable of completely interrupting a current within 30 milliseconds after initial current interruption, and shall not show any evidence of restriking after 30 milliseconds.

(f) The blown fuse shall show only superficial damage.

[37 FR 7562, Apr. 15, 1972, as amended at 43 FR 12316, Mar. 24, 1978]

§ 28.41 Testing requirements; general.

(a) The open circuit voltage of the test circuit shall be 300 volts d.c., or 600 volts d.c., depending on the voltage rating of the fuse being tested.

(b) Time constant of the circuit (defined as $T = L/R$, where T is the time in seconds, L is the inductance in henries, and R is the resistance in ohms) shall be as follows:

(1) For 10,000 amperes and greater currents, $T = 0.016$ second or more;

(2) For 1,000 amperes to 10,000 amperes, $T = 0.008$ second or more;

(3) For 100 amperes to 1,000 amperes, $T = 0.006$ second or more; and

(4) For less than 100 amperes, $T = 0.002$ seconds or more.

(c) Test currents shall be as follows:

(1) 200 percent of rated current for fuses having 200 or less ampere rating, or 300 percent of rated current for fuses having greater than 200 ampere rating;

(2) 900 percent of rated current;

(3) 10,000 amperes; and

(4) 20,000 amperes.

(d) The voltage shall continue to be applied for at least 30 seconds after completion of circuit interruption.

(e) Five fuses of each case size shall be tested at each test current specified in paragraph (c) of this section, with the value of the fuse being the maximum value for the case size.

(f) Three of each lot of five fuses shall be preconditioned at 95±5 percent RH for not less than 5 days immediately prior to testing; and the other two fuses of each lot of five shall be preconditioned by heating to 90° C. for 24 hours, and tested within 1 hour after removal from the preconditioning chamber.

(g) At least three of each lot of five fuses shall be tested in a fuse holder of a trolley-tap type, and the fuse holder shall remain intact and shall readily accept and retain a replacement fuse.

PART 29—PORTABLE COAL DUST/ROCK DUST ANALYZERS, AND CONTINUOUS DUTY, WARNING LIGHT, PORTABLE METHANE DETECTORS FOR USE IN COAL MINES

Subpart A—General Provisions

Sec.
29.1 Purpose.
29.2 Approved portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors.
29.3 Use and maintenance of approved portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors.
29.4 Definitions.

Subpart B—Application for Approval

29.10 Application procedures.
29.11 Contents of application.
29.12 Delivery of analyzers and detectors by applicant; requirements.

Subpart C—Fees

29.20 Examination, inspection, and testing of portable coal dust/rock dust analyzers, and continuous duty, warning light, portable methane detectors; fees.
29.21 Additional fees; payment by applicant prior to approval.

Subpart D—Approval and Disapproval

29.30 Certificates of approval; scope of approval.
29.31 Certificates of approval; contents.
29.32 Notice of disapproval.
29.33 Approval labels and markings; approval of contents; use.
29.34 Revocation of certificates of approval.
29.35 Changes or modification of approved analyzers and detectors; issuance of modification of certificate of approval.
29.36 Delivery of changed or modified approved analyzer or detector.

Subpart E—Quality Control

29.40 Quality control plans; filing requirements.
29.41 Quality control plans; contents.
29.42 Proposed quality control plans; approval by MSHA.
29.43 Quality control records; review by MSHA; revocation of approval.

Subpart F—General Construction and Performance Requirements

29.50 Construction and performance requirements; general.

Sec.
29.51 General construction requirements.
29.52 Component parts; minimum requirements.
29.53 Test requirements; general.
29.54 Pretesting by applicant.
29.55 Conduct of examinations, inspections, and tests by MSHA; assistance by applicant; observers; recorded data; public demonstrations.
29.56 Withdrawal of applications; refund of fees.

Subpart G—Portable Coal Dust/Rock Dust Analyzers; Performance and Testing Requirements

29.60 Minimum performance requirements.
29.61 Testing requirements.

TABLE A—SPECIFICATIONS FOR SAMPLING MATERIALS USED FOR COAL DUST/ROCK DUST ANALYZER TESTING (PERCENTAGES BY WEIGHT; PARTICLE SIZE ± 2 PERCENT)

TABLE B—SPECIFICATIONS FOR STANDARD SAMPLES AND INSPECTORS' SAMPLES USED FOR COAL DUST/ROCK DUST ANALYZER TESTING (PERCENTAGES BY WEIGHT WITH ALLOWABLE VARIATIONS OF ± 2 PERCENT)

Subpart H—Continuous Duty, Warning Light, Portable Methane Detectors; Performance and Testing Requirements

29.70 Minimum performance requirements.
29.71 Warning light; performance requirements.
29.72 Accessory quantitative meter; minimum requirements.
29.73 Operative period.
29.74 Calibration adaptors.
29.75 Visual indicator device.
29.76 Testing requirements.

TABLE C—MAXIMUM AND MINIMUM LIMITS OF ERROR FOR ACCESSORY QUANTITATIVE METERS INSTALLED ON CONTINUOUS DUTY, WARNING LIGHT, PORTABLE METHANE DETECTORS

AUTHORITY: Sec. 508 of the Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. 801, 83 Stat. 742), and 36 Stat. 369, as amended, 37 Stat. 681, 30 U.S.C. 3, 5, and 7; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: 37 FR 7565, Apr. 15, 1972, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12316, Mar. 24, 1978.

Subpart A—General Provisions

§ 29.1 Purpose.

The purpose of the regulations contained in this Part 29 is: (a) To establish procedures and prescribe requirements which must be met in filing applications for the approval of portable coal dust/rock dust analyzers for use in measuring the incombustible content of mine dusts, and the approval of continuous duty, warning light, portable methane detectors for use in providing a visual signal of the presence of a methane-air mixture having a methane concentration of 1.0 percent ±0.2 percent, or the approval of changes and modifications of approved portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors; (b) to specify minimum performance requirements and to prescribe methods to be employed in conducting inspections, examinations, and tests to determine the effectiveness of these instruments; and (c) to provide for the issuance of certificates of approval or modifications of certificates of approval for portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors which have met the minimum requirements for performance set forth in this part.

§ 29.2 Approved portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors.

On and after the effective date of this part, portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors shall be considered to be approved for use in coal mines where such instruments are: (a) The same in all respects as those portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors which have been approved as meeting the minimum requirements for performance prescribed in this Part 29; and (b) maintained in an approved condition.

§ 29.3 Use and maintenance of approved portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors.

Approved portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors shall be operated and maintained in accordance with the specifications prescribed by the manufacturer of such instruments, and in accordance with the applicable provisions of Parts 75 and 77, Subchapter O of this chapter.

§ 29.4 Definitions.

As used in this part—

(a) "Applicant" means an individual, partnership, company, corporation, association, or other organization that designs, manufactures, assembles, or fabricates, or controls the design, manufacture, assembly, or fabrication of a portable coal dust/rock dust analyzer or a continuous duty, warning light, portable methane detector, and who seeks to obtain a certificate of approval for such analyzer or detector.

(b) "Approval" means a certificate or formal document issued by MSHA stating that an individual portable coal dust/rock dust analyzer or an individual continuous duty, warning light, portable methane detector has met the applicable minimum requirements of this Part 29, and that the applicant is authorized to use and attach an approval label or plate on any portable coal dust/rock dust analyzer or continuous duty, warning light, portable methane detector manufactured, fabricated, or assembled in conformance with the plans and specifications upon which the approval was based, as evidence of such approval.

(c) "Approved" means conforming to the minimum requirements of this Part 29.

(d) "Bureau" means the U.S. Bureau of Mines, Department of the Interior.

(e) "Coal dust" means particles of coal that can pass a No. 20 sieve.

(f) "Coal Mine" means an area of land and all structures, facilities, machinery, tools, equipment, shafts, slopes, tunnels, excavations, and other property, real or personal, placed upon, under, or above the surface of such land by any person, used in, or to be used in, or resulting from, the work of extracting in such area bituminous coal, lignite, or anthracite from its natural deposits in the earth by any means or method, and the work of preparing the coal so extracted, and includes custom coal preparation facilities.

(g) "Coal mine dust" means solid particles with sizes ranging from submicroscopic to microscopic, including but not limited to coal dust and rock dust.

(h) "Continuous duty, warning light, portable methane detector" means a portable, self-contained instrument, containing a red warning light which flashes in the presence of methane-air mixtures having methane concentrations of 1.0 percent ±0.2 percent.

(i) "Portable coal dust/rock dust analyzer" means a portable, self-contained instrument, capable of indicating the incombustible content of coal mine dust over a range of from 50 percent to 100 percent incombustible.

(j) "Rock dust" means pulverized limestone, dolomite, gypsum, anhydrite, shale, adobe, or other inert material, preferably light colored, 100 per centum of which will pass through a sieve having 20 meshes per linear inch and 70 per centum or more of which will pass through a sieve having 200 meshes per linear inch; the particles of which when wetted and dried will not cohere to form a cake which will not be dispersed into separate particles by a light blast of air; and which does not contain more than 5 per centum of combustible matter or more than a total of 4 per centum of free and combined silica (SiO_2),or, where the Secretary finds that such silica concentrations are not available, which does not contain more than 5 per centum of free and combined silica.

(k) "Work of preparing the coal" means the breaking, crushing, sizing, cleaning, washing, drying, mixing, storing, and loading of bituminous coal, lignite, or anthracite, and such other work of preparing such coal as is usually done by the operator of the coal mine.

(l) "MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to March 9, 1978.

(m) "MSHA" means the United States Department of Labor, Mine Safety, and Health Administration.

[37 FR 7565, Apr. 15, 1972, as amended at 39 FR 24003, June 28, 1974; 43 FR 12316, Mar. 24, 1978]

Subpart B—Application for Approval

§ 29.10 Application procedures.

(a) Inspection, examination, and testing leading to the approval of portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors shall be undertaken by MSHA only pursuant to written applications which meet the minimum requirements set forth in this Subpart B.

(b) Applications shall be submitted in duplicate to Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 20659 and shall be accompanied by a check, bank draft, or money order in the amount specified in Subpart C of this part payable to the order of the U.S. Mine Safety and Health Administration.

(c) Except as provided in §§ 29.54, 29.61(e), and 29.76(b), the examination, inspection, and testing of all portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors shall be conducted at Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W.Va. 26059.

(d) Applicants, manufacturers, or their representatives may visit or communicate with Approval and Certification Center in order to discuss the requirements for approval of any portable coal dust/rock dust analyzer, or continuous duty, warning light, portable methane detector or the proposed designs thereof. No charge shall be made for such consultation and no written report shall be issued by MSHA as a result of such consultation.

[37 FR 7565, Apr. 15, 1972, as amended at 43 FR 12316, 12317, Mar. 24, 1978]

§ 29.11 Contents of application.

(a) Each application for approval shall contain a complete written description, including operating instructions, of the analyzer or detector for which approval is requested together with a set of drawings and specifications (and lists thereof) showing full details of construction of the instrument and of the materials used. Drawings and specifications (and lists thereof) shall be submitted in duplicate.

(b) Drawings shall be titled, numbered, and dated; any revision dates shall be shown on the drawings, and the purpose of each revision being sought shall be shown on the drawing or described on an attachment to the drawing to which it applies.

(c) Each application for approval shall contain a proposed plan for quality control which meets the minimum requirements set forth in Subpart E of this part.

(d) Each application shall contain a statement that the analyzer or detector has been pretested by the applicant as prescribed in § 29.54, and shall include the results of such tests.

(e) Each application for approval shall contain a statement that the analyzer or detector and component parts submitted for approval are either (1) prototypes, or (2) made on regular production tooling, with no operation included which will not be incorporated in regular production processing.

(f) Where any form of radioactivity is employed in the analyzer or detector, the applicant shall submit:

(1) Evidence of compliance with all State regulations with respect to radiation and the use of radioactive materials; and

(2) Evidence of compliance with the requirements set forth in Title 10, Code of Federal Regulations.

§ 29.12 Delivery of analyzers and detectors by applicant; requirements.

(a) Each applicant shall, when an application is filed pursuant to § 29.10 deliver at his own expense, four assembled analyzers or detectors, less the radioactive source, to Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia,

W. Va. 26059. The radioactive source shall be delivered and inserted in the instrument by the applicant following testing of the electrical components of such instrument.

(b) Analyzers, detectors, and component parts submitted for approval must be made from materials specified in the application.

(c) One completely assembled analyzer or detector approved under the provisions of this part may be retained by MSHA as a laboratory exhibit; the remaining instruments will be returned to the applicant at his own expense, upon written request within 30 days after notice of approval. If no such request is made, the instruments will be disposed of by MSHA in such manner as it deems appropriate.

(d) Where an analyzer or detector fails to meet the requirements for approval set forth in this part, all instruments and components delivered intact in accordance with this section will be returned to the applicant at his own expense, upon written request within 30 days after notice of disapproval. If no such request is made, the instruments will be disposed of by MSHA in such manner as it deems appropriate.

[37 FR 7565, Apr. 15, 1972, as amended at 43 FR 12316, Mar. 24, 1978]

Subpart C—Fees

§ 29.20 Examination, inspection, and testing of portable coal dust/rock dust analyzers, and continuous duty, warning light, portable methane detectors; fees.

Except as provided in § 29.21, the following fees shall be charged by MSHA for the examination, inspection, and testing of portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors:

(a) Examining and recording drawings and specifications prior to inspection, examination and testing	$110
(b) Intrinsic-safety investigation and test under Part 18 of this chapter (MSHA Schedule 2G)	105
(c) Inspection and explosion testing	175

§ 29.21 Additional fees; payment by applicant prior to approval.

(a) MSHA reserves the right to conduct any examination, inspection, or test it deems necessary to determine the quality and effectiveness of any analyzer, detector, or component, and to assess the cost of such examinations, inspections, or tests against the applicant prior to the issuance of any approval for the instrument examined, inspected or tested.

(b) The fees charged for the additional examination, inspection, and testing of analyzers, detectors, and components shall be at the rate of $100 per day for each man-day required to be expended by MSHA.

(c) Upon completion of all examinations, inspections, and tests of analyzers, detectors, and components, MSHA shall advise the applicant in writing of the total cost assessed and the additional amount, if any, which must be paid to MSHA as a condition of approval.

(d) MSHA shall refund any overpayment to the applicant upon the issuance of any approval or notice of disapproval.

Subpart D—Approval and Disapproval

§ 29.30 Certificates of approval; scope of approval.

(a) MSHA shall issue certificates of approval pursuant to the provisions of this subpart only for individual, completely assembled portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors which have been examined, inspected, and tested, and which meet the minimum requirements set forth in Subparts G and H, as applicable.

(b) MSHA shall not issue an informal notice of approval. However, if the application for approval, submitted in accordance with § 29.11, states that the submitted analyzer, detector, and component parts are only prototypes, MSHA will examine, inspect, and test such prototype analyzer, detector, and component parts in accordance with the provisions of this Part 29. If, upon completion of such examinations, inspections and tests, it is found that the prototype meets the minimum requirements set forth in this part, MSHA may inform the applicant, in writing, of the results of the examinations, inspections, and tests, and may require him to resubmit analyzers, detectors, and component parts, as applicable, made on regular production tooling, with no operations included which will not be incorporated in regular production processing, for further examination, inspection, and testing, prior to issuance of the certificate of approval.

(c) Applicants required to resubmit analyzers, detectors, and component parts made on regular production tooling, with no operation included which will not be incorporated in regular production processing, shall be charged fees in accordance with Subpart C of this part.

§ 29.31 Certificates of approval; contents.

(a) The certificate of approval shall contain a description of the analyzer or detector for which it is issued as provided in this part.

(b) The certificate of approval shall specifically set forth any restrictions or limitations, if any, on use of the instrument.

(c) Each certificate of approval shall be accompanied by the drawings and specifications (and lists thereof) submitted by the applicant in accordance with § 29.11. These drawings and specifications shall be incorporated by reference in the certificate of approval and shall be maintained by the applicant. The drawings and specifications listed in each certificate of approval shall set forth in detail the design and construction requirements which shall be met by the applicant during commercial production of the instrument.

(d) Each certificate of approval, shall be accompanied by a reproduction of the approval label design to be employed by the applicant with each approved instrument as provided in § 29.33.

(e) No test data or specific laboratory findings will accompany any certificate of approval, however, MSHA will release pertinent test data and specific findings upon written request by the applicant, or when required by statute or regulation.

(f) Each certificate of approval shall also contain the approved quality control plan as specified in § 29.42.

§ 29.32 Notice of disapproval.

(a) If, upon the completion of the examinations, inspections, and tests required to be conducted in accordance with the provisions of this part, it is found that the analyzer or detector does not meet the minimum requirements set forth in this part, MSHA shall issue a written notice of disapproval to the applicant.

(b) Each notice of disapproval shall be accompanied by all pertinent data or findings with respect to the defects of the instrument for which approval was sought with a view to the possible correction of any such defects.

(c) MSHA shall not disclose, except to the applicant upon written request or when required by statute or regulation, any data, findings or other information with respect to any instrument for which a notice of disapproval is issued.

§ 29.33 Approval labels and markings; approval of contents; use.

(a) Upon receipt of a certificate of approval, the applicant shall submit to MSHA, for approval of contents, samples or full-scale reproductions of approval plates, labels, and markings and a sketch or description of the method of application and position on the instrument, together with instructions for the use and maintenance of the instrument.

(b) Approval labels shall bear the emblem of the Mine Safety and Health Administration, the applicant's name and address, the restrictions or limitations placed upon the use of the instrument by MSHA, an approval number assigned by MSHA, and other information necessary for identification of the instrument.

(c) MSHA shall, where necessary, notify the applicant when additional labels, markings or instructions will be required.

(d) Approval labels and markings shall only be used by the applicant to whom they were issued.

(e) Legible reproductions or abbreviated forms of the label approved by

MSHA for use on each analyzer and detector shall be affixed, attached to, or printed on the instrument at a location where it can be easily seen.

(f) The use of any MSHA approval label obligates the applicant to whom it is issued to maintain or cause to be maintained the approved quality control sampling schedule and the acceptable quality level for each characteristic tested, and to guarantee that the instrument is manufactured according to the drawings and specifications upon which the certificate of approval is based.

(g) Each analyzer and detector shall be labeled distinctly to show the name of the applicant, and the name and letters or numbers by which the instrument is designated for trade purposes, and the serial number or approximate date of manufacture.

[37 FR 7565, Apr. 15, 1972, as amended at 43 FR 12316, Mar. 24, 1978]

§ 29.34 Revocation of certificates of approval.

MSHA reserves the right to revoke, for cause, any certificate of approval issued pursuant to the provisions of this part. Such causes include, but are not limited to, misuse of approval labels and markings, misleading advertising, violations of section 109(e) of the Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. 819(e)), and failure to maintain or cause to be maintained the quality control requirements of the certificate of approval.

§ 29.35 Changes or modification of approved analyzers and detectors; issuance of modification of certificate of approval.

(a) Each applicant may, if he desires to change any feature of an approved analyzer or detector, request a modification of the original certificate of approval issued by MSHA for such instrument by filing an application for such modification in accordance with the provisions of this section.

(b) Applications shall be submitted as for an original certificate of approval, with a request for a modification of the existing certificate to cover any proposed change.

(c) The application shall be accompanied by appropriate drawings and specifications, and by a proposed quality control plan which meets the requirements of Subpart E of this part.

(d) The application for modification, together with the accompanying material, shall be examined by MSHA to determine whether testing will be required.

(e) MSHA shall inform the applicant of the fee required for any additional testing and the applicant will be charged for the actual cost of any examination, inspection, or test required, and such fees shall be submitted in accordance with the provisions of Subpart C of this part.

(f) If the proposed change or modification meets the requirements of this part, a formal certificate of modification will be issued, accompanied, where necessary, by a list of new and revised drawings and specifications covering the change(s) and reproductions of revised approval labels.

§ 29.36 Delivery of changed or modified approved analyzer or detector.

An approved analyzer or detector for which a formal certificate of modification has been issued shall be delivered by the applicant to Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, as soon as it is commercially produced.

[37 FR 7565, Apr. 15, 1972, as amended at 43 FR 12316, Mar. 24, 1978]

Subpart E—Quality Control

§ 29.40 Quality control plans; filing requirements.

As a part of each application for approval or modification of approval submitted pursuant to this part, each applicant shall file with MSHA a proposed quality control plan which shall be designed to assure the quality of the instrument for which approval is sought.

§ 29.41 Quality control plans; contents.

(a) Each quality control plan shall contain provisions for the management of quality, including: (1) Requirements for the production of quality data and the use of quality control records; (2) control of engineering drawings, documentations, and changes; (3) control and calibration of measuring and test equipment; (4) control of purchased material to include incoming inspection; (5) lot identification, control of processes, manufacturing, fabrication, and assembly work conducted in the applicant's plant; (6) audit or final inspection of the completed product; and (7) the organizational structure necessary to carry out these provisions.

(b) Each provision for final inspection in the quality control plan shall include a procedure for the selection of a sample of the end product and the functional components thereof for testing, in accordance with procedures set forth in Military Standard MIL-STD-105D, "Sampling Procedures and Tables for Inspection by Attributes," or Military Standard MIL-STD-414, "Sampling Procedures and Tables for Inspection by Variables for Percent Defective," or an approved equivalent sampling procedure, or an approved combination of sampling procedures. Military Standard MIL-STD-105D, "Sampling Procedures and Tables for Inspection by Attributes," and Military Standard MIL-STD-414, "Sampling Procedures and Tables for Inspection by Variables for Percent Defective" are hereby incorporated by reference and made a part hereof. These documents are available for examination at Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

(c) The sampling procedure shall include a list of the characteristics to be tested by the applicant or his agent.

(d) The characteristics listed in accordance with paragraph (c) of this section shall be classified according to the potential effect of such defect and grouped in to the following classes:

(1) *Critical.* A defect that judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product; or a defect that judgment and experience indicate is likely to prevent performance of the function of the end product.

(2) *Major.* A defect, other than critical that is likely to result in failure, or to reduce materially the usability of the unit or product for its intended purpose.

(3) *Minor.* A defect that is not likely to materially reduce the utility of the instrument for its intended purpose, or a defect that is a departure from established standards and has little bearing on the effective use or operation of the instrument.

(e) The quality control inspection test method to be used by the applicant or his agent for each characteristic required to be tested shall be described in detail.

(f) Each item manufactured shall be 100 percent inspected for defects in all critical characteristics and all defective items shall be rejected.

(g) The Acceptable Quality Level (AQL) for each major or minor defect so classified by the applicant shall be:

(1) Major—1.0 percent;

(2) Minor—4.0 percent.

(h) Except as provided in paragraph (i) of this section, inspection level II as described in MIL-STD-105D, or inspection level IV as described in MIL-STD-414, shall be used for major and minor characteristics and 100 percent inspection for critical characteristics.

(i) Subject to the approval of MSHA, where the quality control plan provisions for raw material, processes, manufacturing, and fabrication inspection are adequate to ensure control of finished article quality, destructive testing may be conducted at a lower level of inspection than that specified in paragraph (h) of this section.

[37 FR 7565, Apr. 15, 1972, as amended at 43 FR 12316, Mar. 24, 1978]

§ 29.42 Proposed quality control plans; approval by MSHA.

(a) Each proposed quality control plan submitted in accordance with this subpart shall be reviewed by MSHA to determine its effectiveness in ensuring the utility of the instrument for which an approval is sought.

(b) If MSHA determines that the proposed quality control plan submitted by the applicant will not insure adequate quality control, MSHA shall require the applicant to modify the procedures and testing requirements of the plan prior to approval of the plan and issuance of any certificate of approval.

(c) Approved quality control plans shall constitute a part of and be incorporated into any certificate of approval issued by MSHA, and compliance with such plans by the applicant shall be a condition of approval.

§ 29.43 Quality control records; review by MSHA; revocation of approval.

(a) The applicant shall keep quality control inspection records sufficient to carry out the procedures required in MIL-STD-105D or MIL-STD-414, or an approved equivalent sampling procedure.

(b) MSHA reserves the right to have its representatives inspect the applicant's quality control test methods, equipment, and records, and to interview any employee or agent of the applicant in regard to quality control test methods, equipment, and records.

(c) MSHA reserves the right to revoke, or cause, any certificate of approval where it finds that the applicant's quality control test methods, equipment, or records do not ensure effective quality control over the instrument for which the approval was issued.

Subpart F—General Construction and Performance Requirements

§ 29.50 Construction and performance requirements; general.

(a) MSHA shall issue approvals for portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors which have met the applicable minimum requirements set forth in this Part 29.

(b) In addition to the types of analyzers and detectors described in Subparts G and H of this part, MSHA will issue approvals for other portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors subject to such additional requirements as may be imposed in accordance with § 29.53.

§ 29.51 General construction requirements.

Portable coal dust/rock dust analyzers and continuous duty, warning light, portable methane detectors will not be accepted by MSHA for examination, inspection, and testing unless they are designed on sound engineering and scientific principles, constructed of suitable materials, and evidence good workmanship.

§ 29.52 Component parts; minimum requirements.

(a) The components of each instrument approved by MSHA for use where permissibility is required shall meet the requirements for permissibility and intrinsic safety set forth in Part 18, Subchapter D of this chapter (Bureau of Mines Schedule 2G).

(b) The components of each instrument shall be:

(1) Designed and constructed to prevent creation of any hazard to the user; and

(2) Assembled to permit easy access for inspection, cleaning, and repair of functional parts.

(c) Replacements parts shall be constructed to maintain the effectiveness of the instrument.

§ 29.53 Test requirements; general.

(a) Each instrument and its components shall, when tested by the applicant and MSHA, meet the applicable performance and test requirements set forth in Subparts G and H of this part.

(b) In addition to the minimum requirements set forth in Subparts G and H of this part MSHA reserves the right to require, as a further condition of approval, any additional or other minimum requirements it deems necessary to establish the quality effectiveness, and safety of any instrument.

(c) Where it is determined after receipt of an application that additional or other minimum requirements will be required for approval, MSHA will notify the applicant in writing of the additional or other minimum requirements, and necessary examinations, inspections, and tests, stating generally its reasons for such requirements, examinations, inspections or tests.

§ 29.54 Pretesting by applicant.

(a) Prior to any application for approval or modification of approval, the applicant shall conduct, or cause to be conducted, examinations, inspections, and tests of analyzer or detector performance which are equal to or exceed the severity of those prescribed in this part.

(b) With the application, the applicant shall provide a statement to MSHA showing the types and results of the examinations, inspections, and tests performed as required under paragraph (a) of this section and state that the analyzer or detector meets the minimum requirements of Subpart G or H of this part, as applicable. Complete examination, inspection and test data shall be retained on file by the applicant and be submitted, upon request, to MSHA.

(c) MSHA may, upon written request by the applicant, provide drawings and descriptions of its test equipment and otherwise assist the applicant in establishing a test laboratory or securing the services of a testing agency.

§ 29.55 Conduct of examinations, inspections, and tests by MSHA; assistance by applicants; observers; recorded data; public demonstrations.

(a) All examinations, inspections, and tests conducted by MSHA pursuant to Subparts G and H of this part will be under the direction and control of MSHA.

(b) MSHA may as a condition of approval, require the assistance of the applicant or agents of the applicant during the assembly, disassembly, or preparation of any instrument or instrument component prior to testing or in the operation of such instrument during testing.

(c) Necessary government personnel, persons assisting MSHA pursuant to paragraph (b) of this section, and such other persons as are requested by MSHA or the applicant to be observers, shall be present during any examination, inspection or test conducted prior to the issuance of an approval by MSHA for the instrument under consideration.

(d) MSHA shall hold as confidential any analyses, drawings, specifications, or materials submitted by the applicant and shall not disclose any principles or patentable features of such equipment, except as required by statute or regulation.

(e) As a condition of each approval issued for any analyzer or detector, MSHA reserves the right, following the issuance of such approval, to conduct such public tests and demonstrations of the approved instrument as it deems appropriate.

[37 FR 7565, Apr. 15, 1972, as amended at 39 FR 24003, June 28, 1974]

§ 29.56 Withdrawal of applications; refund of fees.

(a) Any applicant may, upon a written request submitted to MSHA, withdraw any application for approval of any analyzer or detector.

(b) Upon receipt of a written request for the withdrawal of an application, the MSHA shall determine the total amount due for services already performed during the course of any examinations, inspections, or tests conducted pursuant to such application. The total amount due shall be determined in accordance with the provisions of §§ 29.20 and 29.21 and assessed against the fees submitted by the applicant. If the total amount assessed is less than the fees submitted, MSHA shall refund the balance together with a statement of the charges made for services rendered.

Subpart G—Portable Coal Dust/Rock Dust Analyzers; Performance and Testing Requirements

§ 29.60 Minimum performance requirements.

(a) Portable coal dust/rock dust analyzers shall be self-contained units, practical in operation, portable, and suitable for service in underground coal mines.

(b) The analyzer shall be equipped with a quantitative indicating device that is capable of indicating the incombustible content of coal mine dusts over the range of from 50 percent to 100 percent incombustible.

(c) Analyzers equipped with batteries shall be constructed so that when such batteries are filled, electrolyte will not spill during use.

(d) Battery containers shall be made of corrosion resistant material.

§ 29.61 Testing requirements.

(a) Portable coal dust/rock dust analyzers shall be tested to ensure that they meet the minimum construction and performance requirements set forth in §§ 29.51, 29.52, and 29.60.

(b) The sampling materials listed in Table A shall be used in testing the capability of the indicating device of the portable coal dust/rock dust analyzer to measure incombustible content as specified in § 29.60(b).

(c) The indicating device of the analyzer being tested shall be within ±3 percent of the chemically determined incombustible content for 80 percent of the standard samples and inspector's samples listed in Table B.

(d) In preparing sampling materials for testing, all sampling materials shall be:

(1) Air equilibrated;

(2) Carefully mixed to minimize segregation or degradation;

(3) Stored in moisture- and air-tight containers to prevent oxidation and drying; and,

(4) Analyzed for percent incombustible content within ±1 percent, by chemical analysis.

(e) In order to determine the reliability and utility of the analyzer, personnel of MSHA shall field test the instrument for 1 month in various underground coal mines, in accordance with the applicant's operating and maintenance instructions.

(f) MSHA may conduct any additional field testing it deems necessary.

TABLE A—SPECIFICATION FOR SAMPLING MATERIALS USED FOR COAL DUST/ROCK DUST ANALYZER TESTING (PERCENTAGES BY WEIGHT; PARTICLE SIZE ±2 PERCENT)

1. Bruceton mine coal, Pittsburgh Seam, 6 to 8 percent ash, 100 percent through U.S. No. 100 sieve, 70 percent through U.S. No. 200 sieve.

2. Pocahontas low volatile, 5 to 6 percent ash, less than 0.7 percent total sulfur, 70 percent through U.S. No. 200 sieve.

3. Pittsburgh Seam, run-of-mine, 27 to 32 percent ash, 1.5 to 2.5 percent sulfur, 100 percent through U.S. No. 20 sieve and 20 percent through U.S. No. 200 sieve.

4. Pyrite, coal-derived, 90 percent or better FeS_2, 70 percent through U.S. No. 200 sieve.

5. $MgCO_3$, analytical grade, powdered, 70 percent through U.S. No. 200 sieve.

6. Ash, mineral matter content of 50 to 80 percent from preparation plant refuse, less than 5 percent pyrite, 70 percent through U.S. No. 200 sieve.

7. Limestone, 99 percent $CaCO_3$, 70 percent through U.S. No. 200 sieve.

8. Dolomite, approximately 41 percent $MgCO_3$, 70 percent through U.S. No 200 sieve.

9. Gypsum, approximately 45 percent $CaSO_4 \cdot 2H_2O$, 70 percent through U.S. No. 200 sieve.

10. Traction sand, (Quartz) 100 percent through U.S. No. 20 sieve.

11. Flammable hydraulic oil (petroleum based).

TABLE B—SPECIFICATIONS FOR STANDARD SAMPLES AND INSPECTORS' SAMPLES USED FOR COAL DUST/ROCK DUST ANALYZER TESTING (PERCENTAGES BY WEIGHT WITH ALLOWABLE VARIATIONS OF ±2 PERCENT)

Standard Samples

1. Bruceton coal and limestone to form 55, 65, 75, and 85 percent incombustible (ash and limestone plus 0.3 to 0.6 percent inherent moisture).

2. Bruceton coal and dolomite to 55, 65, 75, and 85 percent incombustibles.

3. Bruceton coal and gypsum to 55, 65, 75, and 85 percent incombustibles.

4. Pocahontas coal and limestone to 55, 65, 75, and 85 percent incombustibles.

5. Pocahontas coal and dolomite to 55, 65, 75, and 85 percent incombustibles.

6. Pittsburgh seam coal and limestone to 55, 65, 75, and 85 percent incombustibles.

7. Pittsburgh seam coal and dolomite to 55, 65, 75, and 85 percent incombustibles.

8. Moisture added to sample 6 of 65 percent incombustibles resulting in 70 percent incombustibles.

9. Moisture added to sample 6 of 55 percent incombustibles resulting in 65 percent total incombustibles.

10. Pyrite added to sample 1 of 55 percent resulting in 56 percent incombustibles.

11. Pyrite added to sample 4 of 65 percent resulting in 66 percent incombustibles.

12. Pyrite added to sample 6 of 75 percent resulting in 76 percent incombustibles.

13. $MgCo_3$ added to sample 1 of 55 percent resulting in 58 percent incombustibles.

14. $MgCo_3$ added to sample 2 of 65 percent resulting in 68 percent incombustibles.

15. $MgCO_3$ added to sample 3 of 70 percent resulting in 78 percent incombustibles.

16. Ash added to sample 6 of 55 percent resulting in 60 percent incombustibles.

17. Ash added to sample 6 of 55 percent resulting in 70 percent incombustibles.

18. A mixture consisting of 30 percent ash, 45 percent Pittsburgh coal, and 25 percent limestone.

19. Sand added to sample 1 of 55 percent resulting in 60 percent incombustibles.

20. Sand added to sample 1 of 55 percent resulting in 65 percent incombustibles.

21. Sand added to sample 1 of 55 percent resulting in 75 percent incombustibles.

22. Hydraulic oil added to sample 1 of 55 percent resulting in 50 percent incombustibles.

23. Hydraulic oil added to sample 1 of 55 percent resulting in 45 percent incombustibles.

Inspectors' Samples

1. A group of 25 samples shall be chosen from samples taken by MSHA inspectors during their regular mine surveys of rock dust sufficiency.

2. The type of rock dust and coal present in the mine from which such samples were taken shall be made available for purposes of calibration.

3. Where the quantity of individual samples is insufficient to supply the sample volume required for testing, composite samples of adequate volume will be used.

Subpart H—Continuous Duty, Warning Light, Portable Methane Detectors; Performance and Testing Requirements

§ 29.70 Minimum performance requirements.

(a) Continuous duty, warning light, portable methane detectors shall be self-contained units, practical in operation, portable and suitable for service in underground coal mines.

(b) The detector shall be equipped with an indicating device that contains one or more warning lights designed and constructed to flash in the presence of a methane-air mixture having a methane concentration of 1 percent ±0.2 percent.

(c) Detectors equipped with batteries shall be constructed so that when such batteries are filled, electrolyte will not spill during use.

(d) Battery containers shall be made of corrosion-resistant material.

§ 29.71 Warning light; performance requirements.

(a) Warning lights contained in the indicating devices of detectors shall:

(1) Be visible within the normal visual field of miners working in the vicinity of the detector;

(2) If incandescent, employ lamps of no less than 0.2 candlepower; or

(3) If light-emitting diodes (LED's), have sufficient intensity to be discernible in the working place of an underground coal mine; and,

(4) Be red in color.

(b) The flash rate of the warning light shall be approximately one flash per second, and the duty cycle shall be sufficiently long to attract attention.

§ 29.72 Accessory quantitative meter; minimum requirements.

(a) In addition to the warning lights described in § 29.71, an accessory meter may be installed in a continuous duty, warning light, portable methane detector, to serve as a quantitative indicator of the presence of methane.

(b) Where an accessory quantitative meter is installed on a detector, it shall meet the following minimum requirements for performance and accuracy:

(1) Accessory quantitative meters shall indicate the presence of methane concentrations as low as 0.25 percent and shall have upper scale limits of 2 percent to 4 percent methane. The indications for these percentages shall be within the limits of error specified in Table C;

(2) Accessory quantitative meters shall make no less than 30 determinations for the presence of methane without replacement of any component part, and no less than 15 such determinations prior to recharging of the battery or other power source; and,

(3) The scale of accessory quantitative meters shall not be subdivided into smaller divisions than is warranted by the general accuracy of the meter.

§ 29.73 Operative period.

Detectors shall be tested to ensure that they operate effectively over a 10-hour period (a) without requiring battery replacement or recharging, and (b) without loss of initial accuracy.

§ 29.74 Calibration adaptors.

(a) Each detector shall be equipped with an adaptor that checks the overall response of the instrument to a premixed, methane-air mixture, having a concentration of not less than 1 percent or more than 3 percent, by volume.

(b) Adaptors shall be compatible with methane calibrating kits marketed for methane monitor calibration.

§ 29.75 Visual indicator device.

Each detector shall be equipped with a device capable of giving a visual indication of the operative condition of the battery and the electrical circuitry employed in the detector.

§ 29.76 Testing requirements.

(a) Continuous duty, warning light, portable methane detectors shall be tested to ensure that they meet the minimum construction and performance requirements set forth in §§ 29.51, 29.52, 29.70, 29.71, 29.73, 29.74, and 29.75.

(b) Accessory quantitative meters shall be tested at several percentages within the limits of error specified in Table C, and at temperatures ranging from 50° and 70° F., with 5° increments. Ten tests shall be made at each percentage selected, and neither the average of the 10 tests, nor more than two tests for each percentage, shall exceed the limits of error specified in Table C.

(c) In order to determine the reliability and utility of the detector, personnel of MSHA shall field test the instrument for 1 month in various underground coal mines, in accordance with the applicant's operating and maintenance instructions.

(d) MSHA may conduct any additional field testing it deems necessary.

TABLE C—MAXIMUM AND MINIMUM LIMITS OF ERROR FOR ACCESSORY QUANTITATIVE METERS INSTALLED ON CONTINUOUS DUTY, WARNING LIGHT, PORTABLE METHANE DETECTORS

Percent methane	Minimum limit of error—percent of methane	Maximum limit of error—percent methane
0.25	0.10	0.40
0.50	0.35	0.65
1.00	0.80	1.20
2.00	1.80	2.20
3.00	2.70	3.30
4.00	3.70	4.30

SUBCHAPTER E—MECHANICAL EQUIPMENT FOR MINES; TESTS FOR PERMISSIBILITY AND SUITABILITY; FEES

PART 31—DIESEL MINE LOCOMOTIVES

Sec.

31.1 Type of locomotive that may be approved.
31.2 Definitions.
31.3 Conditions under which approvals may be granted; preliminary steps.
31.4 General requirements.
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31.8 Changes in design subsequent to approval.
31.9 Recommendations on the use of diesel locomotives underground.
31.10 Revision of requirements and recommendations.

AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, sec. 212, 66 Stat. 709; 30 U.S.C. 3, 5, 7, 482; secs. 301(a) and 32(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 95-173 as amended by Pub. L. 96-164, 30 U.S.C. 957, 83 Stat. 803.

NOTE: Nomenclature changes appear at 43 FR 12317, Mar. 24, 1978.

§ 31.1 Type of locomotive that may be approved.

Safe operation of diesel locomotives underground involves consideration of four possible hazards, namely (a) toxic or objectionable gases discharged in the exhaust of the engine, (b) ignition of methane-air mixtures by the engine or by electrical equipment, (c) fire hazards presented by the engine fuel oil and by coal dust or other combustible material in contact with the locomotive, and (d) mechanical hazards. Locomotives for use in coal mines, where methane may be encountered, will be granted approval when proved by test to offer adequate protection against all these hazards.

[Sched. 22, 9 FR 13743, Nov. 17, 1944, as amended by Supp. 7, 20 FR 2719, Apr. 23, 1955]

§ 31.2 Definitions.

For the sake of brevity and clearness certain terms will be used throughout this part and their definitions as thus used follow:

(a) *Adequate.* Appropriate and sufficient as determined by mutual agreement between the manufacturer and MSHA.

(b) *Approval.* Official, formal written notification issued by MSHA to a responsible organization, stating that upon investigation the locomotive is judged to have satisfactorily complied with the requirements of this part. (Approvals will be granted for complete locomotives only, and not for engines and other individual parts used in the assembly of such locomotives.)

(c) *Explosion-proof.* So constructed that the enclosing case is capable of withstanding internal explosions of methane-air mixtures without damage to the case or discharge of flame and without ignition of explosive methane-air mixtures surrounding the enclosing case.

(d) *Extension of approval.* Official written notification from MSHA to the locomotive manufacturer, by which the latter is authorized to make changes in permissible locomotives after the changes have been duly examined, accepted, and recorded by MSHA.

(e) *Flame arrester.* A device so constructed that flames or sparks from the engine cannot propagate an explosion of methane-air mixtures through it.

(f) *Normal operation.* The performance by each part of the locomotive of those functions for which each part was designed.

(g) *Permissible.* Completely assembled and conforming in every respect with the design formally approved by MSHA under this section. (Approvals under this section are given only to equipment for use in gassy and dusty mines.)

(h) *Toxic and objectionable gases.* Toxic and objectionable gases present in the exhaust of diesel engines are carbon monoxide, oxides of nitrogen, carbon dioxide, and aldehydes. The exhaust also will contain oxides of sulfur if the fuel contains sulfur.

(i) *Fuel: air ratio.* The ratio of fuel to air present in the combustion space of the engine, expressed in terms of weight, as pound of fuel per pound of air. Fuel: air ratio at any operating condition may be calculated from the composition of the exhaust gas and of the fuel.

(j) *Gas-air mixtures, explosive mixtures, inflammable mixtures, or inflammable atmospheres.* These terms refer to such mixtures created by mixing natural gas with normal air. Natural gas that will be used by MSHA in testing diesel mine locomotives consists chiefly of methane, with smaller proportions of higher hydrocarbons and approximately 1 percent of nitrogen.

(k) "MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to March 9, 1978.

(l) "MSHA" means the United States Department of Labor, Mine Safety and Health Administration.

[Sched. 22, 9 FR 13743, Nov. 17, 1944, as amended by Supp. 1, 20 FR 2719, Apr. 23, 1955; 39 FR 24004, June 28, 1974; 43 FR 12317, Mar. 24, 1978]

§ 31.3 Conditions under which approvals may be granted; preliminary steps.

(a) *Consultation.* Upon appointment, manufacturers, engineers, or their representatives may visit the Approval and Certification Center, to discuss the requirements of this part or to obtain criticisms of proposed designs of equipment to be submitted for test. There is no charge for such consultation.

(b) *Application.* Before MSHA will undertake the active investigation leading to approval of any locomotive, the manufacturer shall make application by letter for an investigation leading to approval of his locomotive. This application in duplicate, accompanied by a check, bank draft, or money order, payable to the U.S. Mine Safety and Health Administration to cover all the necessary fees, shall be sent to Approval and Certification Center, Box 201 B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059 together with the required drawings and specifications.

(c) *Fees.*

1. Preliminary review of drawings, specifications, and related data—new machine	$50
2. Tests to determine composition of engine exhaust gases	2,400
NOTE: For preliminary or check testing that requires only carbon dioxide and carbon monoxide determinations, the fee shall be $800.	
3. Tests to determine effectiveness of engine flame arrester	325
NOTE: For check testing a redesigned flame arrester that requires less than 20 tests, the fee shall be $165.	
4. Detailed inspection of engine flame arrester	100
5. Detailed inspection of manifolds, exhaust conditioners, and other parts of intake and exhaust systems	150
6. Detailed inspection of electrical units—each explosion-proof enclosure	105
NOTE: When less than 20 explosion tests are required, the inspection fee shall be $60.	
7. Explosion tests of electrical units—each explosion-proof enclosure	70
NOTE: When less than 20 explosion tests are required, the fee shall be $35.	
8. Exhaust conditioner performance tests to determine rate of water consumption	120
9. Surface temperature determinations and tests of safety controls	220
10. Each field inspection of completely assembled machine	450
11. Tests of exhaust-gas dilution not made concurrently with field inspections of completely assembled machine	115
12. Final examination and recording of drawings and specifications preparatory to issuing an approval	175
13. Examining and recording drawings and specifications for an extension of approval, each 4 hours or fraction thereof	35

NOTE: When investigation, inspection, or testing is required to be performed at locations other than MSHA's premises, the applicant shall reimburse MSHA for traveling, subsistence, and incidental expenses of its representative(s) in accordance with standard Government travel regulations. Such reimbursement shall be in addition to the fee charged for investigation, inspection, or testing.

(d) *Drawings and specifications required.* (1) MSHA will not undertake the inspection and test of locomotive equipment until a set of legible drawings, bill of material, and specifications sufficient in number and detail to identify the parts fully have been delivered to Approval and Certification Center. No drawings or specifications should be sent to the Washington office of MSHA. Drawings should be numbered and dated to facilitate identification and reference in the records.

(2) The drawings and specifications for locomotives that are to be submitted for approval shall include the following:

(i) An assembly drawing or drawings clearly showing the over-all dimensions of the locomotive, the character, size, and relative arrangement of the electrical parts and the wiring between them, also the size and position of the fuel tank, engine flame arresters, the exhaust-gas cooling and dilution systems, and other protective features of the engine.

(ii) A drawing or drawings that shall specify the material and detailed dimensions of all parts that make up explosion-proof enclosures, also of those parts that form any portion of the joints through which possible flames might escape.

(iii) Any other drawings necessary to identify or explain any feature that is to be considered in the approval of the locomotive.

(iv) A wiring diagram for all electrical equipment and circuits on the locomotive shall be submitted.

(v) The complete rating of each starting motor and charging generator, also the capacity of all fuses, and the setting of overload protective devices shall be given. The size of conductors used in all the various circuits shall be specified.

(3) All drawings are to be handled as strictly confidential by MSHA.

(e) *Factory inspection form.* Each locomotive shall be carefully inspected by the manufacturer before it leaves the factory. The manufacturer will be required to furnish MSHA with a copy of the form to be used by him in this inspection. The form shall draw special attention to the points that must be checked in making certain that the safety features of the locomotive are in proper condition, are complete in all respects, and agree in every detail with the drawings and specifications filed with MSHA.

(f) *Instruction manual.* The manufacturer shall furnish an instruction manual with each locomotive. This manual shall give complete instructions covering the operation and servicing of the locomotive, particularly with reference to proper adjustment and maintenance of the engine and its auxiliaries in minimizing the production of smoke and toxic gases in the exhaust, in reducing fire hazards, and in maintaining flame arresters and flame-proof equipment in proper condition. A copy of this manual shall be submitted to MSHA for review.

(g) *Material required for investigation.* Unless requested to do so, the manufacturer need not send a complete locomotive for the purposes of inspection and test. Usually one engine with protective equipment, one fuel tank, one motor, starting switch or other electrical unit of a given design need be shipped to MSHA for the investigation. Any special tools necessary to disassemble any parts for inspection or test shall be furnished with the equipment submitted.

(h) *Shipment of material.* All shipments must be prepaid. Before making any shipments the manufacturer shall obtain shipping instructions from MSHA. He shall arrange and pay for any trucking that may be necessary between the freight depot and the testing station. He shall also take care of crating and removal of parts upon completion of the investigation.

Inspection and tests usually are undertaken in the order of receipt of parts, provided that application, fees, and drawings have been received.

(i) *Assistance required during investigation.* When requested to do so, the manufacturer shall provide one or more men to assist in disassembling parts for inspection and in preparing them for test. These persons may serve as witnesses of the tests.

(j) *Observers at formal investigations and demonstrations.* No one shall be present during any part of the formal investigation conducted by MSHA which leads to approval for permissibility except the necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon by the applicant and MSHA. Upon granting approval for permissibility, MSHA will announce that such approval has been granted to the device and may thereafter conduct, from time to time in its discretion, public demonstrations of the tests conducted on the approved device. Those who attend any part of the investigation, or any public demonstration, shall be present solely as observers; the conduct of the investigation and of any public demonstration shall be controlled by MSHA. Results of chemical analyses of material and all information contained in the drawings, specifications, and instructions shall be deemed confidential and their disclosure will be appropriately safeguarded by MSHA.

[Sched. 22, 9 FR 13743, Nov. 17, 1944, as amended by Supp. 1, 20 FR 2720, Apr. 23, 1955; 30 FR 3756, Mar. 23, 1965; 43 FR 12317, Mar. 24, 1978]

§ 31.4 General requirements.

(a) *Quality of material, workmanship, and design.* MSHA reserves the right to refuse to test any equipment that, in the opinion of qualified representatives of MSHA, is not constructed of suitable materials, or that gives evidence of faulty workmanship, or that is not designed upon sound engineering principles. This right shall apply to all parts of the equipment, and to the design thereof, whether or not the points in question are covered specifically by the requirements of this part.

(b) *Type of engine considered for approval.* Only locomotives equipped with engines of the compression-ignition type will be considered for approval. Such engines shall be designed to operate only on liquid fuel or flash point not less than 150° F. The starting mechanism shall consist of an explosion-proof electric motor or other device considered safe; engines using gasoline or other volatile fuel for starting will not be considered.

(c) *Fuel injection.* The fuel-injection system of the engine shall be so constructed that the mechanism controlling maximum fuel injection may be fixed definitely, permitting adjustment only by breaking a seal on a locked compartment, or by altering design. Provision shall be made in the fuel-injection system to permit suitable adjustment in maximum fuel injection for engine operation at different barometric pressures.

(d) *Engine intake system*—(1) *Construction of engine intake system.* The intake system of the engine (exclusive of the air cleaner) shall be of such construction that it will withstand internal pressures of 125 pounds per square inch, or such internal pressures as may be developed within it in explosion tests with gas-air mixtures, whichever is the greater. All joints in the intake system shall be formed by flanged metal-to-metal contacts designed in accordance with requirements for other types of explosion-proof equipment as outlined in paragraph (i)(6)(ii) of this section.

(2) *Intake flame arrester.* (i) The intake system of the engine shall be equipped with a flame arrester to prevent propagation of flame from the system to a surrounding inflammable atmosphere. The flame arrester shall be so designed and attached to the intake system that it may be removed readily for inspection, repair, replacement, or cleaning. The flame arrester shall be so constructed that it may be cleaned readily. The flame arrester shall be of sufficiently rugged construction to withstand use in its intended application and shall be so situated in the locomotive assembly that it is protected from damage.

(ii) The component parts of any flame arrester must be positively positioned. If a flame arrester of the spaced-plate type is used, the thickness of the plates must be at least 0.125 inch; the space between plates must be no greater than 0.02 inch; and the width or plates must be at least 1 inch. The unsupported length of the plates shall be such that deformation in the intended application shall not exceed 0.002 inch. Plates shall be of material not subject to corrosion in the intended application.

(3) *Air shut-off valve in engine intake.* A valve shall be provided in the engine intake system so that the supply of air to the engine may be shut off. This valve shall be operable from the driver's compartment and shall be so arranged that it may be actuated only when the fuel supply to the engine is shut off.

(4) *Air cleaner on engine intake.* An air cleaner of automotive type shall be included in the engine intake system. The air cleaner shall be situated in the intake system so that the intake air shall pass through the cleaner before entering the intake flame arrester. The size and design of the air cleaner shall be such that resistance to air flow will not increase rapidly in dusty atmospheres.

(5) *Attachment of gage to engine intake system.* A vacuum gage shall be attached to the engine intake system at a point suitable for indicating total pressure drop through that system. The gage shall be graduated in inches of water and shall be situated in the driver's compartment.

(e) *Engine exhaust system*—(1) *Construction of engine exhaust system.* The exhaust system of the engine shall be of such construction that it will withstand internal pressures of 125 pounds per square inch or such internal pressures as may be developed within it in explosion tests with gas-air mixtures, whichever pressure is the greater. All joints in the exhaust system shall be formed by flanged metal-to-metal contacts designed in accordance with requirements for other types of explosion-proof equipment as outlined in paragraph (i)(6)(ii) of this section.

(2) *Exhaust flame arrester.* (i) The exhaust system of the engine shall be provided with a flame arrester to prevent propagation of egress of flame or heated particles from the exhaust system to a surrounding inflammable atmosphere The flame arrester shall be so designed that it is readily accessible for inspection, repair, replacement, or cleaning. The flame arrester shall be of sufficiently rugged construction to withstand use in its intended application and shall be so situated in the locomotive assembly that it is protected from damage.

(ii) The component parts of any flame arrester must be positively positioned. If a flame arrester of the spaced-plate type is used the thickness of the plates must be at least 0.125 inch; the space between plates must be no greater than 0.02 inch; and the width of plates must be at least 1 inch. The unsupported length of the plates shall be such that deformation in the intended application shall not exceed 0.002 inch. Plates shall be of material not subject to corrosion in the intended application.

(3) *Exhausts cooling system.* (i) A cooling system shall be provided for the exhaust gas of the engine. The heat-dissipation capacity of this cooling system shall be such that the temperature of the undiluted exhaust gas shall not exceed 160° F. at the point of discharge from the cooling system under any condition of operation. A device shall be provided which shall stop the engine automatically and immediately if the temperature of the exhaust gas reaches 180° F. at the point of discharge from the cooling system.

(ii) Cooling preferably shall be obtained by a water spray entering the exhaust system at a point close to the outlet of the exhaust manifold or by passing the exhaust gas through water in suitable containers, or by a combination of the two. If a water spray is used, the water shall be delivered to the spray nozzle by a pump, and the water shall pass through a filtering device to protect the spray nozzle from clogging by extraneous material. Provision shall be made for draining and cleaning all exhaust cooling boxes included in the locomotive assembly.

(iii) If cooling equivalent to that obtained by the use of water can be provided by other means, such means will be considered acceptable.

(4) *Control of surface temperature of exhaust systems.* (i) Provisions shall be made for limiting the temperature attained by the external surfaces of the exhaust system. The temperature of such surfaces shall not exceed 400° F. under any condition of engine operation. If water-jacketed parts are used the jackets shall be integral with the parts in question. Insulating coverings that would absorb oil will not be considered acceptable.

(ii) If a water spray is employed to reduce the temperature of the exhaust gas, as mentioned in paragraph (e) (3) of this section, the spray shall be situated as closely as possible to the outlet of the exhaust manifold to aid in reducing surface temperature of this portion of the exhaust system.

(iii) Exterior surfaces of the exhaust system shall be designed to minimize accumulation and lodgment of combustible dusts and to permit ready access to these surfaces for cleaning.

(5) *Dilution of exhaust gas.* (i) Provision shall be made to dilute the exhaust gas with air before it is discharged from the locomotive into the surrounding atmosphere. The quantity of diluting air shall be such that

the discharged mixture of exhaust gas and air shall not contain more than 100 parts per million by volume, of carbon monoxide; 25 parts per million, by volume, of oxides of nitrogen (as equivalent nitrogen peroxide); or 10 parts per million, by volume, of aldehydes (as equivalent formaldehyde) under any condition of operation.

(ii) The final (diluted) exhaust of the locomotive shall be discharged in such manner that it is not directed toward the locomotive operator's compartment and shall be deflected downward so that persons alongside the locomotive do not encounter the exhaust at breathing level.

(6) *Temperature indicator in exhaust system.* A temperature-indicating device shall be provided in the exhaust system to indicate the temperature of the undiluted exhaust gas after its final contact with cooling water. The indicating portion of this device shall be situated in the operator's compartment of the locomotive.

(7) *Provision for attachment of gage or gas-sampling equipment to exhaust system.* A connection shall be provided in the engine exhaust system for temporary attachment of a gage at a point suitable for measuring the total back pressure in that system. This connection shall be suitable also for temporary attachment of gas-sampling equipment to the exhaust system. This opening into the exhaust system shall be provided with a locking closure.

(f) *Composition of exhaust gas.* Under normal operating conditions, and within the rated power output range, and undiluted exhaust gas of the engine shall not contain more than 0.25 percent, by volume, of carbon monoxide.

(g) *Locomotive fuel-supply system*—(1) *Fuel tank.* (i) The fuel tank shall be fuel-tight and shall be of metal at least $\frac{3}{16}$-inch thick welded at all seams. The fuel tank shall be provided with a drain plug (not a valve or pet cock) that shall be locked in position when inserted. The fuel tank shall be provided with a vent opening of such design that atmospheric pressure is maintained inside the tank and that discharge of liquid fuel from the vent opening is prevented. Construction of the fuel tank shall be such that fuel may be added to the tank only through a self-closing valve situated at least 1 foot from the exhaust manifold of the engine and preferably below it. The self-closing valve shall constitute a fuel-tight closure when fuel is not being added. Any part of the self-closing valve that would be detached during the addition of fuel shall be secured to the locomotive to prevent loss.

(ii) The fuel tank shall be a built-in unit comprising part of the locomotive assembly, and no provision shall be made for attachment of separate or auxiliary fuel tanks to the locomotive.

(2) *Fuel lines.* All fuel lines to the engine and its accessory parts shall be installed so that they are not subject to damage in ordinary use and shall be designed to resist breakage from vibration.

(3) *Valve in fuel line.* A shut-off mechanism, operable from the driver's compartment, shall be provided in the fuel system so that the engine may be stopped immediately in an emergency.

(h) *Signal or warning devices.* All locomotives shall be equipped with a bell, horn, or other suitable warning device. This device shall not be electrically operated.

(i) *Electrical equipment*—(1) *Classification of electrical parts.* The electrical parts of a locomotive that may cause ignition of mine gas and coal dust are classified as follows:

(i) *Class 1.* Class 1 shall include motors, starting switches, fuses and all their parts that may produce sparks or flashes as the result of normal operation. Headlights, motors, rheostats, electromagnets, and similar parts which may become dangerous because of failure of electrical circuits in them are also included in this class. Parts in this classification shall be enclosed in explosion-proof casings.

(ii) *Class 2.* Class 2 shall include all parts, such as batteries and external connections and wiring between enclosures, that do not produce sparks or flashes as the result of normal operation but may do so as the result of accident. Parts in this classification shall have adequate shields or guards of a strength and character proportionate to the risk of injury, or else they shall be enclosed in explosion-proof casings.

(iii) *Class 3.* Class 3 shall include all parts such as plugs and receptacles that may produce sparks or flashes in normal operation, but are not of necessity operated while the locomotive is in a gassy place. Parts in this classification shall be enclosed in explosion-proof or adequately locked casings. If locked casings are used, they shall have adequate mechanical strength.

(2) *Type of electrical system.* The electrical system on the locomotives shall be completely insulated from the chassis, the engine, and all other metal parts.

(3) *Automatic protection of electrical circuits and equipment.* (i) On locomotives using storage batteries for starting of engines, each electrical conductor from the battery to the starting motor shall be protected against short circuit by fuses or other suitable automatic circuit-interrupting devices placed at the battery unless conductors of adequate size are provided.

(ii) Fuses or other automatic circuit-interrupting devices shall be inserted at the point where branch circuits are connected to the main circuit between the charging generator and battery. Headlight circuits and circuits for instruments and instrument-panel lights are construed as being branch circuits.

(iii) Fuses shall be enclosed in explosion-proof casings with locked or sealed covers.

(4) *Conductors, conduits, and wiring* (i) Every conductor shall have adequate insulation from "ground" and from conductors of opposite polarity. Insulation shall be selected with special reference to its ability to resist deterioration from engine heat and oil.

(ii) It is recommended that all conductors have a carrying capacity of not less than 110 percent of the total current rating of the motor or other load connected to them. The basis for determining such carrying capacity shall be that given by the National Electrical Code for "allowable carrying capacities of wires."

(iii) All wiring, particularly that outside of locked or explosion-proof enclosures, shall have adequate mechanical and electrical protection to minimize gas-ignition hazards as well as fire hazards. If for any reason rigid conduit is unsuitable or undesirable a good grade of rubber air hose or equivalent may be construed as meeting the requirement for mechanical protection if used where it will not be damaged by engine heat and oil. Flexible metal conduit is not acceptable. All conduit ends must be adequately clamped or otherwise secured to prevent their being pulled out. Inserts should be used to prevent collapse of hose conduit ends that are secured by external clamps.

(iv) Sharp edges and corners shall be removed at all points where there is possibility of damaging the insulation of wires, cables, or conduits by cutting or abrasion.

(v) Wiring and conduits shall be well-cleated or otherwise held to prevent vibration and displacement.

(vi) The ends and terminal lugs of wires and cables shall be held or clamped in a manner that will minimize the possibility of the ends and lugs coming loose from their connections and swinging against sides of enclosing casings or against parts of opposite polarity.

(5) *Electrical clearances and insulation.* The clearance between live parts and casings of electrical equipment shall be such as to minimize the possibility of arcs striking to the casings, or if space is limited the casings shall be lined with adequate insulation.

(6) *Detailed requirements for class 1 electrical parts; enclosure casings*—(i) *Materials and construction.* The casings forming the enclosure for class 1 parts shall be of suitable material and especially durable in order that, with proper care and maintenance, the explosion-proof qualities will remain unimpaired not only when subjected to pressures developed during explosion tests, but also under the severe conditions imposed by mining service. Sheet metal used in the fabrication of explosion-proof casings shall be at least ¼-inch thick for any wall or cover having an area of 216 square inches or more (12 by 18), unless adequate reinforcing ribs, or their equivalent, are used to prevent deformation. Less than $\frac{3}{16}$-inch thickness is not recommended. If welding is employed to join the side and wall pieces, the joints shall be con-

tinuously welded gas tight both inside and out.

Casings may be either of the totally enclosed type, in which no provision is made for ventilation of the interior, or else the type having provision for ventilation or relief of pressure from internal explosions. Totally enclosed construction, however, is recommended by MSHA. Complicated castings and fabricated housing should be pressure-tested at the factory to reveal blowholes and other weaknesses.

If provision is not made for pressure relief through special devices, the casing will need to be strong enough to withstand explosion pressures approaching 100 pounds per square inch. However, if a casing communicates with another through a small passage or is itself divided by a partition, the effect of "pressure-piling" may be produced, and pressures considerably in excess of 100 pounds per square inch may be anticipated.

The use of phenolic and other insulating materials that give off highly explosive gases when decomposed by electric arcs should be avoided in mounting live parts within explosion-proof enclosures.

(ii) *Joints and machining tolerances.* Where an explosion-proof enclosure consists of two or more metal parts that are held together by bolts or other suitable means, the flanges comprising the joints between parts shall have surfaces making metal-to-metal contact. Glass-to-metal joints are permitted in casings such as those for headlights and meters. Gaskets, if adequate may be used to obtain a firm seat for the glass, but not elsewhere. Rubber, putty, and plaster of paris are not acceptable as gasket materials.

The surfaces comprising a flange joint need not be all in one plane. For enclosures having an unoccupied volume (air space) of more than 60 cubic inches. The total width of joint measured along the shortest path from inside to outside of the enclosure shall not be less than 1 inch, except as follows:

A rabbet joint having a total width of ¾-inch may be accepted if neither the cylindrical nor the plane fit is less than 3/16-inch wide, with a maximum radial clearance of 0.002 inch for the cylindrical fit. When the unoccupied volume (air space) is less than 60 cubic inches, a minimum width of ¾-inch may be accepted for plane joints, but a 1-inch width of plane or rabbet joint is recommended.

The width of blow holes in joint surfaces will be deducted in measuring flange widths. Diameters of holes for bolts or screws required to maintain tight joints will also be deducted in such measurement: (*a*) If excessive clearance (over 1/64-inch radial) is allowed for the bolt in its hole, and (*b*) if the diameter of the bolt hole is more than half of the required metal-to-metal contact. It is recommended that such holes be located so that the shortest distance along the joint from the interior of the enclosure to the edge of the hole is not less than 7/16-inch. However, less than ¼-inch will not be accepted for 1-inch joints, nor less than 7/16-inch for joints under 1 inch. (Exception may be made for narrow interpoles, in which case the distance from the edge of pole piece to the bolt hole in the motor frame shall not be less than ⅛-inch and the diametrical clearance around the bolt shall be as stated in the next paragraph of this subdivision. Furthermore, the pole piece shall seat against the frame surface.)

Bolts and screws shall be close-fitting in holes that cut through joint surfaces. If the edge of a bolt or screw hole is less than 7/16-inch from the interior of the enclosure, the diametrical clearance around the bolt or screw shall not exceed 1/64-inch and this clearance shall be maintained for a distance of at least ½-inch as measured from the joint.

When the flanges of a joint cannot be brought into actual contact with each other owing to warping or faulty machining of parts or necessity for sliding fits, the requirement for metal-to-metal contact will be construed as having been met for plane flanges under the following conditions:

1. If the separation does not exceed 0.004 inch at any point.
2. If the 0.004-inch separation does not extend over 6 inches along the joint.
3. Provided the joint does not permit discharge of flame during the explosion tests.

When it is necessary in manufacture to provide for a running fit between cylindrical surfaces other than motor shafts, a shoulder shall be included in the design to provide a change in direction through the flame path between the parts. In joints of this type, the diametral clearance between cylindrical surfaces shall be kept as small as feasible, but in no case shall it exceed 0.01 inch.

Laminated motor frames having end rings assembled as an integral part under high pressure may be considered with less width of contact between the end rings and laminations than that specified in the preceding paragraphs of this subdivision. It is recommended that the metal-to-metal contact be kept as near the 1-inch standard as practical, but less than ¼ inch will not be accepted. If less than the 1-inch standard width is used for joints of this type, the construction must permanently preclude any separation between the end rings and lamination, and if a 0.0015-inch-thickness gage can be inserted ⅛-inch at any point, the construction will be considered unsatisfactory. The joint should not open under explosion pressures.

(iii) *Bolts and similar fastenings.* Bolts and similar means of clamping flange joints together shall be generously proportioned to minimize stripping of threads and to give adequate strength. Steel inserts shall be used when it is necessary to thread screws or bolts into aluminum castings. Clamping bolts and screws should be at least ¼ inch in diameter and preferably not less than ½ inch.

Unless the design permits especially rigid construction between bolts, spacings greater than 6 inches are not recommended for flange joints.

All bolts, nuts, and screws used in fastening flange joints, as well as those used in holding parts such as pole pieces, brush rigging, and bearing caps, shall be provided with lock washers or other suitable means to prevent loosening. The length of threads in bottomed holes and on bolts, screws, and studs shall be such that the joint can be made tight even though lock washers are omitted.

(iv) *Through holes for bolts, screws, and rivets.* Through holes into explosion-proof casings shall be kept to a minimum. Holes for bolts, screws, etc., shall be "blind" or bottomed if the omission of a bolt or screw would leave an unprotected opening into the casing. If unavoidable, holes may be made through casings for bolts, studs, or screws that are necessary to hold essential parts such as pole pieces and brush rigging, providing the bolts, etc. have an adequate long close fit through the casing and providing at least two holes, studs, or screws are used for each part held. In addition one of the following optional conditions shall apply: (*a*) Each hole must be bottomed in the part held and adequate metal-to-metal contact provided between the part and the casing to insure an effective internal seal around the hole in the event that the bolt or screw is omitted or lost, or (*b*) if studs are used they must be permanently fastened in the part held, or (*c*) bolts passing entirely through pole pieces must be arranged so that they cannot be removed without removal of the armature, or (*d*) special nonremovable bolts must be adequate for the intended purpose.

Holes shall not be drilled through walls of explosion-proof casings for screws or rivets holding name plates or approval plates

(v) *Inspection openings and covers.* The number of openings in explosion-proof enclosures shall not exceed the minimum required for proper assembly and inspection of parts. Openings such as those necessary for inspection of motor commutator and brushes are permitted if suitable covers are provided. These covers must have the width of flange joint previously specified or a threaded joint with sufficient threads to give the required width of surface in contact. Screw covers and those held by special clamps and screws must be secured against unauthorized opening by means of a lock or a nonrusting wire and seal. Where the seal wire alone is of insufficient mechanical strength, an additional fastening such as a set screw or a pin secured by a seal should be used. The distance between the two holes through which the seal wire is threaded shall not exceed 3 inches.

(vi) *Bearing and shaft clearances.* Armature, controller, switch, and other shafts or rods carried through walls of explosion-proof enclosures do not require stuffing boxes. For plain journaled bearings the diametral clearance between the shaft and bearing shall not exceed 0.01 inch to provide for a running fit, and this running fit shall not be less than ¾-inch long for an enclosure having an internal air space under 60 cubic inches, nor less than 1 inch for enclosures having more than 60 cubic inches air space.

Roller and ball bearings are not accepted as suitable barriers for stoppage of flames, and therefore the flame path provided between a shaft and the inner parts of bearing housings shall not be less than 1 inch long for enclosures of more than 60 cubic inches air space. If the air space is 60 cubic inches or less, this part of the flame path may be reduced to ¾-inch. In either case the diametral clearance shall not be greater than 0.03 inch at any point in the ¾- or the 1-inch path. This clearance is allowed providing it does not permit discharge of flame.

Reduced clearances may be required for the fit of bearing cartridges, collars and other parts forming cylindrical flame paths in bearing housings. Flame paths having radial clearances of more than 0.005 inch should have one change of direction in them.

Oil grooves in bearings and felt rings or oil grooves in bearing housings are not to be included in the measurement of the length of running fit along a shaft. Such grooves are not allowed if not of sufficient volume to reduce the effectiveness of the path. Openings made for purposes of filling and draining bearings shall be outside of the required length of path.

Labyrinths or other special arrangements may be accepted in place of straight paths if they provide equivalent lengths and clearances and are made up of rugged parts not likely to be readily omitted. A removable outer bearing cap is not considered as part of the required length of fit.

(vii) *Cable entrances.* All electrical conductors that pass through the walls of explosion-proof enclosures shall be provided with adequate insulation and guards at the point of entrance to the enclosure in accordance with one or more of the following:

(*a*) If stuffing-box cable entrances are used, the packing material shall be an untreated asbestos, such as woven valve-stem packing, and it shall be not less than 3/16 inch in diameter. The size, length, and kind shall be specified on the drawings or bills of material. The amount of packing material used in each stuffing box shall be such that when compressed, it will completely surround the wire or cable for a distance of not less than ½ inch measured axially.

The stuffing-box design and the amount of packing used shall be such that, with the packing properly compressed, the gland still has a clearance distance of ⅛-inch or more to travel before it meets interference by parts other than packing. The glands shall be secured against loosening. The use of inculating bushings in stuffing boxes is recommended, especially for voltages that exceed 250. When an outer braid insulation covering is used on wires and cables passing through stuffing boxes it should be made of asbestos or slow-burning material.

The width of space for packing material shall not exceed the diameter or width of the uncompressed material by more than 50 percent. At other points small clearance shall be maintained between the stuffing-box parts and the cables or wires passing through them. A clearance greater than 3/64-inch (i.e., 3/32-inch diametral clearance will not be accepted.

Corners shall be well-rounded at all points were cables and wires emerge from bushings, glands, and stuffing boxes to prevent cutting of insulation. Stuffing boxes, if not made integral with enclosures, shall be securely held to enclosures on which they are used.

Stuffing boxes and the fittings connected to them shall be so placed or guarded that they are not likely to be damaged in derailment and other accidents.

The diameter of cables used in stuffing boxes and the dimensions of openings for cables in stuffing boxes shall be given in decimal rather than common fractions.

(*b*) If insulated studs are used they shall be designed and spaced to minimize the possibility of electrical creepage to parts of opposite polarity or to the casing. Terminal lugs shall be keyed to their studs or else shielded by insulating barriers so that they cannot come into contact with each other or with any metal not of the same potential or polarity. Adequate means shall be provided to prevent loosening of the studs and lugs by vibration or by expansion and contraction. Special attention shall be given to the shielding of external stud connections so that they cannot be short-circuited or grounded by accidental or careless contact or by water when the machine is properly assembled.

(*c*) Insulating tubes or bushings shall not be used alone to take wires and cables through walls and partitions or explosion-proof enclosures unless both ends of each tube are wholly within such enclosures. The length of each tube and the clearance around the wire or wires in it should be such as to prevent "pressure-pilling" in the event of flame passing through it. (In general, a diametrical clearance of 1/16 should not be exceeded for single cables in tubes.) Bushings and tubes shall be secured against loosening and shall be of incombustible material.

(*d*) If wires and cables are taken through openings which are closed with sealing compounds, the design of the opening and characteristics of the compounds shall be such as to hold the sealing material in place without tendency of the material to crack or flow out of its place.

(*e*) An explosion-proof connection box may be used to facilitate connection to external circuits, providing the wires are closely fitted or sealed in the opening between the casing and the connection box in a manner adequate to inhibit flame propagation from the box to the enclosure on which it is mounted. A short metal tube or length of rigid conduit permanently secured to both may be used between the casing and the connection box when necessary. The connection box shall comply with all requirements of this paragraph (g)(6) for class 1 compartments and the lead entrance for external connection shall comply with the preceding paragraphs of this subdivision.

(*f*) Lead entrances that are not designed to prevent passage of flame from enclosures may be used in making electrical connections between separated explosion-proof enclosures, provided the conductors are carried in rigid metal conduit or equivalent. This conduit shall be fastened securely to the enclosure and shall be sealed or sufficiently filled with conductors to prevent the propagation of flame through it.

(7) *Parts having special requirements*—(i) *Motors and generators.* The internal construction of bearings for motors and generators shall be capable of preventing the escape of flame during explosion tests with the outer bearing caps removed, unless the outer caps are essential to hold the bearing in place. If the outer caps are essential, they shall comply with the constructional requirements of subparagraph (6) of this paragraph for class 1 parts as to width of joints, fastenings, and through holes.

(ii) *Rheostats and resistors.* Particular attention shall be given to the choice of conductors used both inside and outside of enclosures for rheostats and resistors and to the type of cable entrances in order to prevent grounds and short circuits that might result from failure of insulation due to heat. Rheostats and resistors shall be so designed and proportioned that the temperature of the external surfaces of the enclosure does not exceed 400° F. at any point.

(iii) *Meters and instruments.* Meters and instruments that are actuated electrically shall be insulated from the explosion-proof casing in which they are enclosed. The glass in meter and instrument casings shall be at least ½-inch thick for diameters of 5 inches or more. For diameters under 5 inches, safety glass shall be used and the thickness shall be at least ¼-inch. Meters and instruments shall be shielded by position or have a guard to protect the glass against damage.

(iv) *Headlights.* Headlights shall be mounted in protected positions where they are not likely to be damaged by passing objects. The glass in headlights shall be at least ½-inch thick.

(v) *Push buttons and push-button stations.* Push rods passing through walls of explosion-proof casings shall not be less than ¼-inch in diameter. They shall have a shoulder, head, or equivalent at the inside end to prevent accidental loss or removal from the outside. Cotter pins or parts held by cotter pins are not acceptable as means of preventing this loss or removal.

The diametrical clearance between the push rod and its hole shall not exceed 0.01 inch to provide for sliding fit, and this sliding fit shall not be less than ¾-inch long for an enclosure having an internal air space under 60 cubic inches, nor less than 1 inch for enclosures having more than 60 cubic inches air space. In either case, the required length of sliding fit shall not be decreased when the button is depressed.

When it is important that accidental operation of push buttons be prevented, MSHA reserves the right to require suitable guards or shields for the protection of the external ends of push buttons.

(8) *Class 2 electrical parts having special requirements*—(i) *Battery boxes and batteries.* Battery boxes shall be made of material equivalent in strength to sheet steel not less than 3/16-inch in thickness or of wood reinforced with steel, and shall have a substantial cover or covers lined with nonbrittle insulation of adequate strength, quality, and dimensions. The cover or covers shall be provided with suitable means for locking them in the closed position to prevent opening by unauthorized persons.

Battery boxes shall be provided with means for ample ventilation to prevent accumulation of explosive hydrogen-air mixtures above the battery. Ventilating openings shall be guarded to prevent access to the cell terminals from the outside.

Unless the battery cells are insulated from the trays in an acceptable manner, the trays shall be insulated from the battery box with rubber or equivalent insulators of adequate dimensions. For cells in metal containers mounted in "open-type" trays a lining of wood or equally suitable insulation shall be provided for the bottom of the battery box. All wood and other insulating linings shall be treated or painted with suitable material to resist destruction by battery electrolyte.

The number, type, rating, and manufacturer of the cells comprising the battery shall be specified.

A diagram showing the connections between cells and between trays shall be submitted. The connections shall be such that the maximum total battery potential will not be placed between any two adjacent cells.

[Sched. 22, 9 FR 13744, Nov. 17, 1944]

§ 31.5 Methods of testing.

(a) *Tests of locomotive parts other than electrical*—(1) *Detailed inspection.* An inspection will be made by engineers of MSHA of all parts of the locomotive covered by the requirements of this part or any other parts or features that are associated with safety in operation. This inspection will include the following items:

(i) A detailed inspection to determine the adequacy of materials, workmanship, and design.

(ii) A detailed check of parts or assemblies against drawings as to materials, dimensions, and positions, making notations for necessary correction of any discrepancies that may exist between the drawings and the parts or assemblies.

(iii) Measurements of joints, flanges, and other possible flame paths in the intake and exhaust systems of the engine.

(iv) Measurement of specified dimensions of flame arresters for the intake and exhaust systems of the engine.

(2) *Determination of composition of exhaust gas.* (i) The exhaust gas of the engine will be sampled while the engine is operating at minimum speed and at maximum rated speed. At both speeds the engine will be operated at minimum power output, at approximately one-half maximum rated power output, and at maximum rated power output. Under any of these test conditions the engine will be at temperature equilibrium before exhaust-gas samples are collected or other test

data recorded. Under each test condition rate of fuel consumption will be determined, and atmospheric pressure and temperature will be noted.

(ii) The exhaust-gas samples will be analyzed for carbon dioxide, oxygen, carbon monoxide, hydrogen, methane, nitrogen, oxides of nitrogen, and aldehydes.

(iii) In connection with tests to determine composition of exhaust gas, the maximum permissible reduced pressure in the intake system of the engine and the maximum permissible positive pressure in the exhaust system will be determined. In such tests the engine will be operated at maximum rated speed and the intake and exhaust systems will be complete with all accessory equipment such as air cleaners, flame arresters, and exhaust cooling devices. These maximum pressures will be determined by gradually adding resistance to air flow in the intake system and by similarly adding resistance to exhaust gas flow in the exhaust system and noting the pressure, in each system, at which measurable increase occurs in the content of carbon monoxide (or other toxic constituent) in the exhaust gas. These data will be used, allowing a suitable margin of safety, in determining the maximum permissible reduced pressure and positive pressure, respectively, in the intake and exhaust systems of the engine.

(3) *Maximum permissible fuel: air ratio.* (i) If the carbon monoxide content of the engine exhaust does not exceed 0.25 percent by volume throughout the rate range of speeds and power outputs, the manufacturer's adjustment of the fuel-injection equipment will be considered acceptable. The maximum fuel: air ratio (pound of fuel per pound of air) attained under test will be calculated and will be designated as the maximum permissible fuel: air ratio.

(ii) If the carbon monoxide content of the exhaust is found to exceed 0.25 percent by volume only at or near maximum power output, the maximum fuel: air ration will be determined at which the carbon monoxide content of the exhaust does not exceed 0.25 percent by volume, and this fuel: air ratio will be designated as the maximum permissible fuel: air ratio. Adjustment of the fuel-injection system may be made in the course of these tests to meet the requirement of maximum permissible fuel: air ratio.

(iii) In connection with establishment of maximum permissible fuel: air ratio, the barometric pressure existing during the tests and the rate of fuel consumption at maximum permissible fuel: air ratio will be recorded as part of the requirements for operation of the locomotive under permissible conditions. As stated in § 31.9 operation at barometric pressures significantly lower than that existing during tests to determine the maximum permissible fuel: air ratio will necessitate readjustment of the fuel-injection system so that the maximum permissible fuel: air ratio is not exceeded as a result of the decrease in air density at the lower barometric pressure.

(4) *Adequacy tests of intake and exhaust flame arresters and determination of ability of intake and exhaust systems to withstand internal explosions.* (i) To test the adequacy of intake and exhaust flame arresters and to determine the ability of the intake and exhaust systems to withstand internal explosions, these systems with their respective flame arresters will be connected to the engine and will be filled and surrounded by inflammable gas-air mixtures containing different concentrations of Pittsburgh natural gas. The mixture within the intake and exhaust systems will be ignited by a spark or other suitable means and the pressure developed in the system will be determined. The igniting source will be placed in different locations to determine the maximum pressure developed by the explosion.

(ii) Explosion tests will be made both with quiescent inflammable gas-air mixtures in the intake and exhaust systems and with inflammable gas-air mixtures in motion. In the latter tests the engine will be driven at selected speeds throughout its operating range and no liquid fuel will be supplied to the injection valves.

(iii) Explosion tests will be made both with bituminous-coal dust introduced into the intake system and with oil fog introduced into the exhaust system. These tests will be made with quiescent mixtures in the intake and either quiescent or moving inflammable gas-air mixtures in the exhaust. In tests with bituminous-coal dust in the intake, the intake system will be blanked off from the cylinder head to protect the interior of the engine.

(iv) The temperatures of the flame arresters on the intake and exhaust systems will be maintained at 212° F. or less. The water-spray cooling system will not be in operation, and no water will be present in the exhaust cooling boxes during explosion tests. At least 10 explosion tests will be made for each explosion-proof intake and exhaust system. If the intake and exhaust systems contain questionable construction features more than 10 explosion tests will be made.

(v) The explosion tests of an intake and exhaust system shall not result in: (*a*) Discharge of flame from any joint or opening; (*b*) ignition of surrounding inflammable gas-air mixture; (*c*) development of dangerous afterburning;[1] or (*d*) excessive pressures. (Pressures greater than 150 pounds per square inch gage are considered excessive.) An intake or exhaust system will be rejected if it fails to meet any one of the four conditions.

(vi) In addition to explosion tests, certain other tests may be made at the option of MSHA's engineers to determine the adequacy of a part for the service intended:

(*a*) Spaced-plate flame arresters mounted in the intake and exhaust systems will be examined to determine the space between the plates. When spaced-plate flame arresters are used in the exhaust system the temperature of these plates will be 212° F. when the examination is made.

(*b*) Where the durability of flame arresters is in doubt, such mechanical tests are deemed necessary may be made to determine points requiring strengthening.

(5) *Determination of adequacy of exhaust-gas cooling system and accessory parts thereof.* (i) The adequacy of the exhaust-gas cooling system and its accessory parts will be determined with the engine operating at its maximum power output for a period sufficient for all parts of the engine and exhaust-gas cooling system to reach their respective equilibrium temperatures. The cooling water spray will be in operation, and when equilibrium has been reached all compartments designed to hold cooling water will be filled with a measured quantity of water (at the equilibrium temperature) in accordance with the recommendations of the manufacturer. No cooling air will be circulated over the engine or its accessories during the test.

(ii) The following determinations will be made: (*a*) Exhaust-gas temperature at outlet of exhaust manifold but upstream from cooling water spray; (*b*) final exhaust-gas temperature;[2] (*c*) cooling water consumed; (*d*) temperature of water in all compartments; and (*e*) temperature of cooling water to spray.

(iii) The final exhaust-gas temperature shall not exceed 160° F.

(iv) The water consumed in cooling the exhaust gas under the test conditions of operation shall not exceed that required for the adiabatic saturation of the exhaust gas at the final temperature by more than 10 percent. The water consumed in excess of that required for adiabatic saturation at the final exhaust temperature will be considered as entrained water.

(v) The adequacy of the automatic fuel shut-off actuated by the exhaust temperature will be determined with the engine operating at its maximum power output and with the cooling spray initially in operation. The water to the cooling spray will be shut off, the water in all compartments designed to hold cooling water will be drained, and the final exhaust-gas temperature at which the fuel to the engine is automatically shut off will be noted. The temperature must be between 180° and 190° F.

(vi) Following this test the temperature at the control point will be permitted to drop to 160° F. At this temperature it must be possible to start the engine. If a manual reset is provided in the automatic fuel shut-off control it shall be possible to reset the control and start the engine when the temperature at the control point is 160° F.

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[1] The term "afterburning" as used in this part is applied to combustion of an inflammable gas-air mixture drawn into the system under test by the cooling of the products from an explosion in the system.

[2] Temperature at point of discharge from exhaust cooling system and before exhaust gas is mixed with diluting air.

(vii) At the option of MSHA's engineers any other tests may be made to determine the adequacy of a part for the service intended.

(6) *Determination of surface temperature of engine and accessories.* (i) The surface temperatures of the engine, the exhaust cooling system, and any accessories will be determined with the engine operating at its maximum power output for a period sufficient for all parts of the engine and its accessories to reach their respective equilibrium temperatures. The exhaust-gas cooling system will be in operation, but no air will be circulated over the engine or accessories. Under the foregoing conditions the following surface temperatures will be measured: (*a*) Exhaust-gas manifold at inlet; (*b*) exhaust-gas manifold at outlet; (*c*) engine-surface temperatures at various locations; (*d*) crankcase; (*e*) exhaust flame arrester; (*f*) intake flame arrester; and (*g*) at any other location considered necessary.

(ii) The temperature of any surface measured under the foregoing conditions shall not exceed 400° F.

(iii) At the option of MSHA's engineers the engine may be operated under the foregoing test conditions while completely surrounded by an inflammable natural gas-air mixture. Combustible materials likely to be encountered in service may be placed on any surface. Operation under such conditions shall not cause an ignition of the surrounding inflammable atmosphere.

(iv) In addition to the foregoing tests any other tests may be made at the option of MSHA's engineers to determine the adequacy of the cooling of surfaces of the engine and its accessories.

(7) *Tests of exhaust-gas dilution system.* The adequacy of the exhaust-gas dilution system will be determined by tests of the assembled locomotive. The engine will be operated in normal air, at minimum speed and at maximum rated speed, and will be at temperature equilibrium during the tests. Samples of the final (diluted) exhaust of the locomotive and of the undiluted engine exhaust will be collected simultaneously at both speeds. Analyses of these samples will serve as a basis for calculating the extent of dilution effected by the system. The dilution ratios thus obtained will be applied to the data obtained in tests described in paragraph (a) (2) of this section to determine whether the concentrations of carbon monoxide, oxides of nitrogen, and aldehydes in the diluted exhaust of the locomotive are within the required limits.

(8) *Tests of fuel tank.* The fuel tank will be tested to determine that it is fuel-tight, that the vent will maintain atmospheric pressure within the tank, and that the vent and closure do not permit the egress of liquid fuel.

(b) *Tests of electrical equipment*—(1) *Detailed inspection of class 1 electrical parts.* In the investigation of any machine or equipment for approval and also in the investigation of separate electrical units (individual motors, controllers, etc.) as to suitability for use on permissible machines, explosion-proof casings shall be given careful inspection by MSHA. This inspection will include the following items:

(i) A detailed check of parts against drawings as to materials, dimensions, and position, making notations for necessary correction of discrepancies between the drawings and the parts checked.

(ii) Measurement of joints, bearings, and other possible flame paths.

(iii) Examination for unnecessary through holes.

(iv) Examination for adequacy of lead entrance design and construction.

(v) Examination for adequacy of electrical clearance of insulation between live parts of opposite polarity and between live parts and ground.

(vi) Examination for adequacy and security of fastenings.

NOTE: For further information regarding the details of this inspection reference should be made to Bureau of Mines Information Circular 7185, Inspection and Testing of Mine-Type Electrical Equipment for Permissibility.

(2) *Explosion tests of class 1 electrical parts.* (i) To test enclosures for their ability to retain flame, they will be filled and surrounded with explosive mixtures containing varying percentages of Pittsburgh natural gas[3] and air. The mixture within the enclosure will be ignited by a spark plug or other suitable means, and a record of explosion pressures developed will be taken. The point of ignition will be varied to determine the condition that gives the greatest pressure. For some of the tests, bituminous-coal dust will be introduced into enclosures, and the effects will be noted. Motor armatures and rotors will be stationary in some tests and revolving in others.

(ii) Not less than 10 tests will be made of each design of explosion-proof enclosure. If, on account of the size of enclosure or questionable construction features, it is the judgment of MSHA's engineers that the explosion-proof qualities cannot be completely demonstrated in 10 tests, more than that number will be made.

(iii) The explosion tests of an enclosure shall not result in: (*a*) Discharge of flame from any joint, bearing, or opening; (*b*) ignition of surrounding explosive mixtures; (*c*) development of dangerous afterburning;[4] or (*d*) excessive pressures. (Indicated pressures of 150 pounds per square inch gage or over are considered as being excessive.) An enclosure will be rejected if failing to meet any one of the four above conditions.

(3) *Adequacy tests of electrical parts.* In addition to explosion tests, certain other tests may be made at the option of MSHA's engineers to determine the adequacy of an accessory for the service intended:

(i) Where the durability of battery cells, headlights, or other parts is in doubt, such mechanical tests as are deemed necessary may be made to determine points requiring strengthening.

(ii) If there is any question on the efficacy of ventilation of battery boxes, tests may be made to check the ventilation.

(iii) Switches or circuit breakers and contactors intended to function as switches shall be capable of interrupting any overload currents that will flow without causing the protective devices to open the circuit. They also shall be capable of opening these overloads five times at 2-minute intervals without grounding or short-circuiting.

(iv) Fuses or other automatic circuit-interrupting devices may be tested to determine whether they provide the necessary protection without damaging the explosion-proof qualities of their enclosures.

(4) *Factory inspection and tests.* If necessary to expedite the investigation MSHA will conduct inspections or tests of the locomotive assembly, or any part thereof, at the plant of the manufacturer.

(5) *Additional tests.* MSHA reserves the right to make any additional tests, not covered by the provisions of this part, that may be considered necessary to determine the adequacy of the locomotive, or any part thereof.

[Sched. 22, 9 FR 13748, Nov. 17, 1944]

§ 31.6 Granting of approval.

(a) *Notification of approval or disapproval.* (1) After MSHA has considered the results of the investigation and suitable drawings and specifications have been placed on file, a formal written notification of approval or disapproval of the locomotive will be supplied to the applicant by letter from the MSHA. If the locomotive meets all requirements, the notification of approval will not be accompanied by test date or detailed results of tests. If the locomotive fails to meet any of the requirements, notification of such failure will be accompanied by details of the failure with a view to possible remedy of defects. MSHA will not otherwise release, or make public, results of tests of locomotives that fail to meet the requirements.

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[3] Investigation has shown that, for practical purposes, Pittsburgh natural gas (containing a high percentage of methane) is a satisfactory substitute for pure methane in these tests.

[4] The term "afterburning" as used in this part is applied to combustion, immediately after an internal explosion, of a gaseous mixture that was not in the enclosure at the time of that explosion, but was drawn in as the result of the cooling of the products of the original explosion.

(2) No verbal reports of MSHA's decisions concerning the investigation will be given, and no verbal or informal approvals will be granted.

(3) The manufacturer shall not be free to advertise his equipment as permissible or approved until he has received the formal notification of approval in which an approval number is assigned.

(4) All drawings and specifications that must be submitted to MSHA in connection with the investigation will be retained by MSHA. A drawing list numbered to correspond to the approval number will accompany the notification of approval. This list will include the drawings and specifications covering the details of construction upon which the approval is based. The applicant receiving an approval shall keep exact duplicates of the drawings and specifications retained by MSHA. These are to be adhered to in commercial production of the approved locomotive.

(b) *Approval plate.* (1) With the notification of approval the applicant will receive a photograph of a design of approval plate. The plate will bear the emblem of the Mine Safety and Health Administration, the approval number, designation of the type of equipment for which the approval is granted, and the name of the manufacturer. The plate will bear also a statement regarding maintenance of the equipment in approved condition.

(2) The manufacturer shall have this design reproduced as a plate for attachment to each permissible locomotive. A sample plate and a sketch or description of its proposed mounting on the locomotive shall be sent to Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, for approval before final adoption.

(c) *Purpose and significance of approval plate.* (1) The approval plate identifies the equipment as having complied with the requirements of MSHA for use in gassy and dusty mines.

(2) The use of the approval plate on his equipment obliges the manufacturer to maintain the quality of his product and to see that each locomotive is constructed according to drawings and specifications accepted by, and on file with MSHA. Equipment exhibiting changes in design that do not have official authorization from MSHA are not permissible and therefore must not bear the approval plate.

[Sched. 22, 9 FR 13750, Nov. 17, 1944, as amended by Supp. 1, 20 FR 2720, Apr. 23, 1955; 43 FR 12317, Mar. 24, 1978]

§ 31.7 Withdrawal of approval.

MSHA reserves the right to rescind for cause, at any time, an approval granted under this part.

[Supp. 22, 9 FR 13750, Nov. 17, 1944]

§ 31.8 Changes in design subsequent to approval.

All approvals are granted with the understanding that the manufacturer will make his equipment according to final drawings and specifications submitted to MSHA. Therefore, before making any change in an approved locomotive the manufacturer shall first obtain MSHA's approval of the change. This procedure is as follows:

(a) The manufacturer shall write to Approval and Certification Center, requesting an extension of his original approval and stating the change or changes desired. With this letter he should submit a set of revised drawings and specifications showing the change or changes in detail.

(b) MSHA will consider the application and inspect the drawings and specifications to determine whether it will be necessary to make tests.

(c) If tests are unnecessary, the applicant will be advised by letter from MSHA of the approval or disapproval of the change.

(d) If tests are necessary, the applicant will be advised of the fee and the material required for the tests.

[Sched. 22, 9 FR 13750, Nov. 17, 1944, as amended by Supp. 1, 20 FR 2720, Apr. 23, 1955; 43 FR 12317, Mar. 24, 1978]

§ 31.9 Recommendations on the use of diesel locomotives underground.

The approval of any type of equipment by MSHA means only that the equipment has met certain specified requirements of design and performance, but the approval does not guarantee that it is impossible to use an approved device in an unsafe manner. The manufacturer must develop equipment that will meet the specified requirements of this part to be granted an approval, but it is the responsibility of the user to see that the equipment is maintained in permissible condition and is used in a permissible manner. The use of diesel locomotives underground involves, in addition to proper maintenance of the locomotive itself, certain other factors, such as ventilation, which are of equal importance in establishing safe operating conditions. The following recommendations on the use of diesel locomotives underground are included in this part as an expression by MSHA of the conditions that should be enforced in the use of such equipment. Any locomotive used under conditions that do not comply with these recommendations shall not be considered by MSHA as being permissible. The recommendations are as follows:

(a) *Ventilation*—(1) *Definition of ventilation requirements.* The use of diesel mine locomotives underground should be restricted to haulageways where positive ventilation is maintained by mechanical means. If possible haulage by diesel locomotives should be on the intake of a separate split of the ventilating air current or arrangements should be made in some manner so that air carrying exhaust gases from the engine is returned to the surface without traversing working places. The quantity of ventilating air supplied must be adequate to dilute all toxic or objectionable constituents of the engine exhaust to such extent that the composition of the air of the haulageways, or any working place connected thereto, meets recognized hygienic standards for working environments. The air supplied for ventilation in haulageways where diesel locomotives are used should not contain combustible gas or other contaminants in such concentration that combustion processes in the engine may be altered, with resultant increase in production of toxic or objectionable constituents in the engine exhaust.

(2) *Quantity of ventilating air.* (i) The minimum quantity of ventilating air that must be supplied per unit time will be determined in the approval tests of each permissible locomotive, and this quantity will be shown upon all approval plates issued for diesel mine locomotives. This quantity shall apply to the use of one locomotive only; if more than one locomotive is used in any continuous course of air, then the air quantity required for one locomotive must be multiplied by the number of locomotives in use. Approved locomotives may be used only in places where at least this minimum quantity of ventilation is in effect. As this minimum required quantity of ventilation will be determined during the approval tests, with engines that are new and presumably in the best mechanical condition, it will be desirable always to supply ventilation in excess of the minimum quantity indicated on the approval plate, thus furnishing a factor of safety in operation.

(ii) Ventilation on haulageways should be measured at intervals sufficiently frequent to insure that the required air quantities are being maintained. Records should be kept of such measurements.

(3) *Quality of ventilating air.* The air supplied for ventilation in connection with the use of diesel locomotives underground should contain not less than 20 percent by volume of oxygen (dry basis) and should not contain more than 0.25 percent inflammable gas. This statement applies to the air current before the exhaust gases from the locomotive are added to it.

(4) *Examination of air of working places.* (i) The air of haulageways in which diesel locomotives are used should be examined at intervals sufficiently frequent to determine that the composition of the intake air conforms with the requirements given in paragraph (a)(3) of this section and that the concentration of contaminants, such as carbon dioxide, carbon monoxide, and oxides of nitrogen added to this air by the locomotive are within acceptable limits. Methods used in determining the concentrations of these contaminants and the composition of the intake air of the haulageways should be sufficiently sensitive and accurate to produce reliable results, as the interpretation of these results may

in some instances depend on variations in concentration of as little as 0.01 percent or less. Concentrations of gases considered permissible in working environments are as follows:

Carbon dioxide (CO_2)—not more than 0.5 percent by volume.
Carbon monoxide (CO)—not more than 0.01 percent by volume.
Oxides of nitrogen (NO_2)—not more than 0.0025 percent by volume.
Oxygen (O_2)—not less than 20 percent by volume.

(ii) Ventilation and locomotive operating condition should be such that the composition of the air of haulageways, and working places connected thereto, always remains within these tolerable limits.

(iii) Aldehydes are self-evident if present in objectionable concentrations and need not be determined by analysis. Production of sulfur gases by the locomotive may be controlled by using a fuel oil of low sulfur content.

(iv) A smoky exhaust is a good practical indication of faulty operation and is usually accompanied by the production of excessive quantities of carbon monoxide. Therefore abnormal smoke production should be sufficient reason for removing a locomotive from service until this condition has been corrected.

(v) In the event that any of the foregoing conditions of air quality are not maintained, as determined by analysis of the air, or by observation, operation of locomotives should be stopped until proper conditions of air quality are established, either by increasing ventilation or by correcting mechanical imperfections in the locomotives, whichever is found to be the cause of the undesirable conditions.

(vi) Records should be kept of all air analyses and of any changes in ventilation or adjustments of locomotives made as a result of these analyses.

(b) *Maintenance* (1) *General.* (i) The maintenance of diesel locomotives in permissible condition is absolutely essential if hazards in the use of such equipment are to be avoided. To insure adequate maintenance a qualified and authorized person should be made responsible for all maintenance work. This person should be thoroughly familiar with the proper procedures for maintaining diesel locomotives in permissible condition and he should be assisted when necessary by competent mechanics.

(ii) Inspection and maintenance procedures shall be in accordance with the instructions furnished by the manufacturer. When diesel locomotives are operated for the first time in any situation, daily inspections should be made of the intake and exhaust systems of the engine as outlined below and of other accessories of the locomotive to accumulate information on the frequency of inspections required. Records of all inspections should be kept and a routine inspection schedule should be drafted from experience and information obtained in daily inspections during the first several months of operation.

(iii) All maintenance work should be done in accordance with detailed instructions furnished by the manufacturer of the locomotive. These instructions should form the basis of a routine inspection and maintenance schedule. Some of the more important inspection and maintenance procedures are summarized below.

(2) *Engine fuel-injection system*—(i) *Injection valves.* Improperly functioning injection valves may cause incomplete combustion of some of the fuel and lead to increased production of smoke, carbon monoxide, and aldehydes. It is important therefore to maintain injection valves in proper operating condition. Particular attention should be paid to preventing leaking injection valves and to preventing imperfect atomization or distribution of the fuel.

The manufacturer's recommendations regarding inspection and maintenance of injection valves should be followed and periodic checks on injection pressure and spray pattern should be made as outlined in these recommendations.

(ii) *Fuel pump.* The fuel pump on the engine is set by the manufacturer in accordance with permissibility requirements of MSHA. This setting is made to limit the fuel injected at full throttle and to prevent operation of the engine on the rich side (insufficient air for complete combustion) with the attendant production of dangerous quantities of carbon monoxide. After this adjustment is made the fuel pump is sealed or locked to prevent alteration.

It should not be necessary to reset the fuel pump unless some part breaks or unless the pump is disassembled for a complete overhaul. When it is necessary to set the fuel pump the seal or lock should be broken by an authorized person and the final adjustment should be made under the supervision of this person. After this adjustment has been made the fuel pump should be sealed or locked by an authorized person.

(iii) *Method of adjusting fuel pump.* When it is necessary to reset the stop limiting the fuel injector at full throttle, it is absolutely essential that some means be available for reproducing the original setting. Failure to reproduce the original setting might lead to the production of dangerous quantities of carbon monoxide if too much fuel were injected at full throttle.

Every shop in which diesel locomotives are serviced should have equipment for determining the fuel delivered by the fuel pump when operating in the full-throttle position. The fuel delivery at maximum throttle setting can be determined either by weight or by volume. If the determination is made by volume a suitable correction for the density of the fuel at the existing temperature must be made. The test procedure should be designed so that the maximum quantity of fuel delivered per revolution of the fuel pump can be determined. The fuel pump should be set to deliver a maximum weight of fuel per stroke corresponding to the value specified by the manufacturer for the particular engine and conditions of use.

(iv) *Adjustment of maximum fuel injection for permissible operation at different barometric pressures.* The average barometric pressure existing at the place where a diesel engine is to be used must be considered in setting the maximum fuel injected at full throttle. Barometric pressure affects the density of the air and therefore affects the weight of air drawn into the engine. Unless the quantity of fuel injected at full throttle is adjusted to maintain a constant fuel: air ratio dangerous quantities of carbon monoxide might be produced at high altitude and low barometric pressure where the density of the air is low.

The maximum quantity of fuel for permissible operation at different barometric pressures will be determined in permissibility tests made by MSHA. This information will be furnished the manufacturer and will be included on the approval plate. The fuel pump of the engine should be set in accordance with the values given for the barometric pressure existing at the place where the engine is to be operated.

(3) *Engine intake system.* (i) The intake system of the engine, including flame arrester, air cleaner, and all joints, should be inspected at periodic intervals. The frequency of these inspections shall be determined in accordance with the recommendations made under general maintenance instructions. Periodic measurements should be made of the reduced pressure in the intake system to determine when it is necessary to clean the flame arrester and air cleaner. The permissible maximum reduced pressure will be determined in permissibility tests made by MSHA and will be shown on the approval plates.

(ii) Inspection of the intake system should include the determination of the tightness of all joints and of the cleanliness of all surfaces of the flame arrester.

(iii) The air cleaner should be maintained in accordance with the manufacturer's instructions.

(4) *Engine exhaust system.* (i) The exhaust system of the engine, including the flame arrester, cooling boxes, shut-off mechanism, water spray, and exhaust dilution system, shall be inspected at periodic intervals. The frequency of these inspections shall be determined in accordance with the recommendations made under general maintenance instructions. Periodic measurements should be made of the positive pressure in the system to determine when the exhaust flame arrester should be cleaned. The permissible maximum positive pressure will be determined in permissibility tests

made by MSHA and will be shown on the approval plates.

(ii) The locomotive operators should be made responsible for maintaining an adequate supply of water in the cooling boxes and in the tank supplying water to the spray. It is important that the water used in the exhaust system be substantially free of acid to prevent corrosion. In some situations this might necessitate chemical treatment of the water used in the locomotive.

(iii) The performance of the fuel shut-off mechanism actuated by the exhaust-gas temperature shall be checked periodically. This mechanism can be checked by operating the engine in the repair shop with no water in the cooling boxes and with the water spray off, so that the exhaust-gas temperature at the control point is greater than the temperature required to actuate the control. The engine shall be operated under such conditions and the performance of the automatic fuel shut-off mechanism determined.

(iv) Periodic inspections should be made of all heated engine surfaces at intervals frequent enough to insure that those surfaces are kept free of combustible materials such as coal dust, fuel oil, lubricants, and rags or waste.

(v) The exhaust-gas dilution system should be inspected and cleaned frequently to insure adequate dilution of the exhaust gas before it is discharged from the locomotive. In order to maintain the proper flow of diluting air, it is important that passages through which diluting air flows be kept clean to prevent restriction of air flow.

(vi) If the exhaust from the engine appears smoky or if objectionable odors are evident in the exhaust the manufacturer's manual of instructions should be consulted immediately and the cause determined. Particular attention should be paid to inspecting the fuel injection valves, the pressure in the intake and exhaust system, and the quantity of fuel injected by the fuel pump at full throttle. Restrictions in the intake or excessive pressure in the exhaust can cause smoke and objectionable odor. This can be caused also by the injection of fuel in excess of the permissible maximum. A smoky exhaust usually is indicative of the presence of significant concentrations of carbon monoxide and therefore steps should be taken immediately to determine the cause and eliminate it.

(5) *Electrical equipment*—(i) *Locks and seals.* Certain electrical parts, such as battery boxes and headlights on the locomotive, are furnished with locks or seals to prevent opening for adjustments, repairs, etc., by anyone except authorized persons. Such locks and seals should be kept in place. Precautions should be taken to guard against unauthorized persons obtaining keys or sealing tools.

(ii) *Fastenings.* Joints in the casings of motors, starting switches, headlights, and any other parts subject to sparking during normal operation should be kept tightly closed. An opening greater than 0.004 inch for plane (flat) joints is considered unsafe. Accordingly, all bolts, cap screws, and other means of fastening casings together should always be kept in place and secured tightly. Openings caused by the omission of parts or by the burning resulting from arcs should be carefully avoided.

(iii) *Wiring.* Air hose, rigid steel, and other types of conduit should be firmly held at the ends and also between ends, when lengths are such as to require additional supports. Conduit and other means of affording mechanical protection of wiring should be kept intact and in place.

(iv) *Headlight and instrument lenses.* Lenses forming part of the explosion-proof casings of headlights and instruments should be held securely. Lenses with cracks entirely through them should be replaced immediately.

(v) *Overload protection.* Tampering with fuses, relays, and other means supplied by the manufacturer, for overload and short-circuit protection of wiring and equipment should not be permitted, nor should substitutes that defeat this protection be allowed.

(vi) *Battery.* Battery-cell tops should be kept free of electrolyte and dust. Connections between cells should be kept tight and free of corrosion.

(c) *Fuel.* (1) The fuel used for diesel locomotives in underground service should conform to the manufacturer's specifications for viscosity, pour point, cetane number, carbon residue, and water. The flash point must not be less than 140° F., and the sulfur content must not be greater than 0.5 percent by weight.

(2) Wherever possible the fuel tanks of the locomotives should be filled above ground. In situations where this is not feasible, fuel should be taken underground only in a strong, tight tank mounted on a car and equipped with a flexible hose and a suitable means for transferring the fuel from the tank car to the fuel tank of the locomotive. The flexible hose shall be grounded to the chassis of the fuel tank car. The valve on the end of the flexible hose of the fuel tank car shall be self-closing and designed so that it is open only when the fuel hose is connected to the fuel tank of the locomotive. The air vent on the tank car must be flameproof.

(3) Tank cars of fuel shall be taken underground only when it is necessary to fill the fuel tanks of the locomotives. After filling the fuel tanks of the locomotives the tank cars shall be removed immediately from the underground workings. The full and empty tank cars must be accompanied during shipment by authorized persons. Under no conditions is fuel to be stored underground.

(4) The transfer of fuel from the tank car to the locomotive must be made in the underground diesel repair shop. During transfer of fuel the engine must not be in operation.

(5) If there is a drain at the bottom of a tank on a car, this drain must be closed by a screw cap which can be locked in position to prevent self-opening.

(6) Clean fuel is absolutely necessary to minimize maintenance of the fuel-injection systems. Therefore in handling the fuel all precautions should be taken to keep the fuel clean and free from water.

(d) *Fire extinguishers.* At least one fire extinguisher of the type containing liquid carbon dioxide should be carried at all times with each locomotive. Extinguishers of the same type should be installed at underground locomotive repair shops and locomotive barns.

(e) *Repair shops and locomotive barns.* (1) Repair shops for diesel locomotives and storage of locomotives preferably should be above ground. If such arrangement is impracticable, such spaces should be situated close to the shaft or portal underground and between an intake and a return airway, so that persons in such spaces will be provided with fresh air and so that if engines are operated in the repair shop, or if fire should occur, products of combustion will enter the return air.

(2) Underground repair shops and storage spaces should be lined with incombustible material, and doors, or other closures, should be of incombustible material. The floor should be impervious to oil and should slope to a sump, so that spilled oil may be collected and removed. A supply of sand should be kept on hand to aid in fighting fires or to absorb spilled oil

(3) Welding or other operations that might create fire hazards should not be carried on in the repair shop unless adequate precautionary measures are taken against the ignition of diesel fuel or lubricants.

[Sched. 22, 9 FR 13750, Nov. 17, 1944, as amended by Supp. 1, 20 FR 2720, Apr. 23, 1955]

§ 31.10 Revision of requirements and recommendations.

In the preparation of the requirements and recommendations embodied in this part MSHA has endeavored to provide a basis for the production of safe and practicable diesel mine locomotives that will meet the demands of existing conditions. However, as the use of such locomotives for underground haulage was an innovation in the United States at the time of preparing this part, it is possible that instances might arise in which the protection afforded would be inadequate. MSHA with the cooperation of manufacturers and users of the locomotives, will be alert to such situations. When a situation arises in which inadequacy of protection or unusual hazard attending the use of approved equipment is established, the manufacturer of the equipment is requested to issue precautions, or if necessary to cease marketing the equipment for use in the particular situation or condition until such changes or provisions as will provide adequate protection are made. It shall be understood that any changes or provisions made must be submitted to MSHA and have its approval before being adopted. Should the situation require a change in the basic requirements and tests provided in this part, or the recommendations contained therein, such change will be issued as an amendment to this part.

[Supp. 22, 9 FR 13753, Nov. 17, 1944]

PART 32—MOBILE DIESEL-POWERED EQUIPMENT FOR NONCOAL MINES

Sec.

32.1 Type of equipment that may be approved.
32.2 Definitions.
32.3 Conditions under which approvals may be granted or tests made; preliminary steps preceding approval tests and inspections.
32.4 General requirements.
32.5 Inspection and tests.
32.6 Granting of approval.
32.7 Withdrawal of approval.
32.8 Changes in design subsequent to approval; extension of approval.
32.9 Recommendations on the use of mobile diesel-powered equipment in noncoal mines.
32.10 Revision of requirements and recommendations.

AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, sec. 212, 66 Stat. 709; 30 U.S.C. 3, 5, 7, 482; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

NOTE: Nomenclature changes appear at 43 FR 12317, Mar. 24, 1978.

§ 32.1 Type of equipment that may be approved.

Safe operation of mobile diesel-powered equipment underground involves consideration of four possible hazards, namely, (1) toxic or objectionable gases discharged in the exhaust of the engine, (2) ignition of flammable atmospheres by the engine or by electrical equipment, (3) fire hazards presented by the engine fuel oil and by combustible material that might come in contact with the equipment, and (4) mechanical hazards. Equipment for use in coal mines where methane may be encountered, will be considered permissible only when proved by test to offer adequate protection against all these hazards. (See Part 31 of this subchapter.) Equipment for use in noncoal mines in which the underground atmosphere contains less than 0.25 percent by volume of flammable gas will be granted approval when proved by test to offer adequate protection against the production of toxic or objectionable gases, and when design and construction are such as to minimize the fire hazard presented by the engine fuel oil under normal operating conditions. Since the latter equipment is not to be used in coal mines or other situations where inflammable atmospheres may be encountered, equipment approved under this part will be referred to as "approved equipment" rather than as "permissible equipment", and will carry an "approval plate" rather than a "permissibility plate".

(a) *Approval.* Approvals will be granted for complete diesel-powered equipment units only and not for engines and other individuals parts used in the assembly of such units.

(b) *Inspection and tests of subassemblies.* The engine and exhaust gas cooling system may be supplied as a subassembly to the manufacturer of the complete unit. Under such conditions this sub-assembly may be submitted for inspection and test either by the manufacturer of the complete unit or directly by the manufacturer of the sub-assembly, consisting of engine and exhaust gas cooling system. All requirements to be met under either option are identical Application by the manufacturer of a sub-assembly for such inspection and test shall be made as outlined in § 32.3(b). If the sub-assembly meets all requirements applicable to it, MSHA will inform the manufacturer of the sub-assembly by letter that further test or inspection of the engine and exhaust gas cooling system will not be required after installation in a complete unit if the sub-assembly is constructed in accordance with the specifications on file at MSHA. This letter may be cited to the manufacturer of the complete unit. The manufacturer of a sub-assembly, consisting of engine and exhaust gas cooling system, may not advertise his sub-assembly as approved by MSHA, since only complete mobile units are granted approval. The manufacturer of a sub-assembly that meets the requirements of this part may state that the sub-assembly has been tested by MSHA and meets the requirements of this part that pertain to the engine and exhaust gas cooling system.

[14 FR 1671, Apr. 8, 1949, as amended by Supp. 1, 20 FR 2720, Apr. 23, 1955]

§ 32.2 Definitions.

Certain terms used throughout this part are defined as follows:

(a) *Equipment.* Mobile diesel-powered equipment used to move or transport material underground.

(b) *Unit.* The complete assembly of engine, accessories, and chassis comprising one mobile diesel-powered unit.

(c) *Noncoal mine.* A mine in which the material being mined is incombustible or contains at least 65 percent by weight of incombustible material, and in which the underground atmosphere in any open workings contains less than 0.25 percent by volume of flammable gas. Tunneling operations in which underground conditions conform with the foregoing may be considered in the same category as noncoal mines.

(d) *Normal operations.* The performance by each part of the equipment of those functions for which the part was designed.

(e) *Toxic and objectionable gases.* Toxic and objectionable gases present in the exhaust of diesel engines are carbon monoxide, oxides of nitrogen, carbon dioxide, and aldehydes. The exhaust also will contain oxides of sulfur if the fuel contains sulfur.

(f) *Fuel : air ratio.* The ratio of fuel to air present, under a given condition of operation, in the combustion space of the engine, expressed in terms of weight, as pound of fuel per pound of air. Fuel : air ratio at any operating condition may be calculated from the composition of the exhaust gas and of the fuel.

(g) *Adequate.* Appropriate and sufficient as determined by tests and examinations by MSHA.

(h) *Approved.* As used in this part the term "approved" relates to equipment formally designated by MSHA as suitable for operation in atmospheres containing less than 0.25 percent by volume of flammable gases, and to have conformed to the requirements of this part.

(i) *Approval.* Official, formal, written notification by MSHA stating that upon investigation the equipment has met satisfactorily the requirements of this part.

(j) *Extension of approval.* Official, written notification from MSHA to the equipment manufacturer, by which the latter is authorized to make changes in approved equipment after the proposed changes have been duly examined, accepted, and recorded by MSHA.

(k) "MESA" means the United States Department of the Interior, Mining Enforcement and Safety Administration. Predecessor organization to MSHA, prior to March 9, 1978.

(l) "MSHA" means the United States Department of Labor, Mine Safety and Health Administration.

[14 FR 1672, Apr. 8, 1949, as amended by Supp. 1, 20 FR 2720, Apr. 23, 1955; 39 FR 24004, June 28, 1974; 43 FR 12317, Mar. 24, 1978]

§ 32.3 Conditions under which approvals may be granted or tests made; preliminary steps preceding approval tests and inspections.

(a) *Consultation.* Upon appointment, manufacturers, engineers, or their representatives may visit Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, to discuss the requirements of this part or to obtain criticisms of proposed design of equipment to be submitted for test. There is no charge for such consultation.

(b) *Application.* Before MSHA will undertake the active investigation leading to approval of any equipment, the manufacturer shall make application by letter for an investigation leading to approval of that equipment.

This application in duplicate, accompanied by a check, bank draft, or money order payable to the U.S. Mine Safety and Health Administration, to cover all necessary fees, shall be sent to Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, together with the required drawings and specifications.

(c) *Fees.*

1 Preliminary review of drawings, specifications, and related data—each new machine	$40
2 Tests to determine composition of engine exhaust gases	1,800
NOTE. For preliminary or check testing that requires only carbon dioxide and carbon monoxide determination, the fee shall be $600.	
3 Detailed inspection of exhaust-gas cooling system	120
4 Detailed inspection of electrical system	30
5 Each field inspection of completely assembled machine	265
6 Exhaust-gas-dilution tests independent of field inspection	115
7 Final examination and recording of drawings and specifications preparatory to issuing an approval	110
8 Final examination and recording of drawings and specifications preparatory to issuing a certification of an engine subassembly	55
9 Examining and recording of drawings and specifications for an extension of approval or certification of an engine subassembly, each 4 hours or fraction thereof	35

NOTE. When investigation, inspection, or testing is required to be performed at locations other than MSHA's premises, the applicant shall reimburse MSHA for traveling, subsistence, and incidental expenses of its representative(s) in accordance with standard Government travel regulations. Such reimbursement shall be in addition to the fee charged for investigation, inspection, or testing.

(d) *Drawings and specifications required.* (1) MSHA will not undertake the inspection and test of equipment until a set of legible drawings, bill of material, and specifications sufficient in number and detail to identify the parts fully, have been delivered to Approval and Certification Center. No drawings or specifications should be sent to the Washington Office of MSHA. Drawings should be numbered and dated to facilitate identification and reference in the records.

(2) The drawings and specifications to be submitted shall include the following:

(i) Drawings clearly showing the over-all dimensions of the equipment, the character, size, and relative arrangement of the electrical parts and the wiring between them; also the size and position of the fuel tank and exhaust gas cooling system.

(ii) Any other drawings or illustrations necessary to identify or explain any feature that is to be considered in the approval of the equipment.

(iii) A wiring diagram for all electrical equipment and circuits on the equipment.

(iv) The complete rating of each starting motor and charging generator, also the capacity of all fuses and the setting of overload protective devices.

(v) The size of conductors used in all the various circuits.

(3) All drawings and specifications are to be considered confidential by MSHA.

(e) *Factory inspection form.* Each unit shall be carefully inspected by the manufacturer before it leaves the factory. The manufacturer will be required to furnish MSHA with a copy of the form to be used in this inspection. The form shall draw special attention to the points that must be checked in making certain that the safety features of the unit are in proper condition, complete in all respects, and agree in every detail with the drawings and specifications filed with MSHA.

(f) *Instruction manual.* The manufacturer shall furnish an instruction manual with each unit. This manual shall give complete instructions covering the operation and servicing of the unit, particularly with reference to proper adjustment and maintenance of the engine and its auxiliaries to minimize production of smoke and toxic gases in the exhaust. A copy of this manual shall be submitted to MSHA for review when the reproduction of the approval plate is submitted (see § 32.6(b)).

(g) *Material required for investigation.* Unless requested to do so, the manufacturer need not send a complete mobile unit for the purpose of inspection and test. Usually only an engine, exhaust gas cooling system, required accessory equipment, fuel tank, starting motor and switch need be shipped to MSHA for investigation. Any special tools necessary to disassemble any parts for inspection or test shall be furnished with the equipment submitted.

(h) *Shipment of material.* (1) All shipments must be prepaid. Before making any shipments, the manufacturer shall obtain shipping instructions from MSHA. He shall arrange and pay for any trucking that may be necessary between the freight depot and the testing station. He shall also take care of crating and removal of parts upon completion of the investigation.

(2) Inspection and tests usually are undertaken in the order of receipt of parts, provided that application, fees, and drawings have been received.

(i) *Assistance required during investigation.* When requested to do so, the manufacturer shall provide one or more men to assist in disassembling parts for inspection and in preparing them for test. These persons may serve as witnesses of the tests.

(j) *Observers at formal investigations and demonstrations.* No one shall be present during any part of the formal investigation conducted by MSHA which leads to approval except the necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon by the applicant and MSHA. Upon granting approval, MSHA will announce that such approval has been granted to the device and may thereafter conduct, from time to time in its discretion, public demonstrations of the tests conducted on the approved device.

Those who attend any part of the investigation, or any public demonstration, shall be present solely as observers; the conduct of the investigation and of any public demonstration shall be controlled by MSHA. Results of chemical analyses of material and all information contained in the drawings, specifications, and instructions shall be deemed confidential and their disclosure will be appropriately safeguarded by MSHA.

OMB CONTROL No. 1219-0066. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[14 FR 1672, Apr. 8, 1949, as amended by Supp. 1, 20 FR 2720, Apr. 23, 1955; Sched. 24, 30 FR 3756, Mar. 23, 1965; 43 FR 12317, Mar. 24, 1978; 47 FR 14696, Apr. 6, 1982]

§ 32.4 General requirements.

(a) *Quality of material, workmanship and design.* MSHA reserves the right to refuse to test any equipment that, in the opinion of qualified representatives of MSHA, is not constructed of suitable materials, or that gives evidence of faulty workmanship, or that is not designed upon sound engineering principles. This right shall apply to all parts of the equipment and to the design thereof, whether or not the points in question are covered specifically by the requirements of this part.

(b) *Type of engine considered for approval.* Only mobile equipment powered by engines of the compression-ignition type will be considered for approval. Such engines shall be designed to operate only on liquid fuel of flashpoint not less than 140° F. The starting mechanism shall consist of an electric motor or other device considered safe; engines using gasoline or other volatile fuel for starting will not be considered.

(c) *Fuel injection.* The fuel injection system of the engine shall be so constructed that the mechanism controlling maximum fuel injection may be fixed definitely, permitting adjustment only by breaking a seal or a locked compartment, or by altering design. Provision shall be made in the fuel injection system to permit suitable adjustment in maximum fuel injection for engine operation at different barometric pressures.

(d) *Engine intake system*—(1) *Air-cleaner on engine intake.* An air-cleaner of automotive type shall be included in the engine intake system. The size and design of the air-cleaner shall be such that resistance to air-flow will not increase rapidly in dusty atmospheres.

(2) *Provision for attachment of gage to engine intake system.* A connection shall be provided to permit attachment of a gage to the engine intake system at a point suitable for indicating total pressure drop through that system. This connection shall be internally threaded with standard pipe threads of size not larger than half inch and is to be closed by a pipe plug when not in use.

(e) *Engine exhaust system*—(1) *Exhaust gas cooling system.* (i) A cooling system shall be provided for the exhaust gas of the engine. The heat-dissipation capacity of this cooling system shall be such that the temperature of the exhaust gas shall not exceed 160° F. at the point of discharge from the cooling system under any condition of operation.

(ii) Cooling may be obtained by a water-spray entering the exhaust system at a point close to the outlet of the exhaust manifold, or by passing the exhaust gas through water in suitable containers, or by a combination of the two. If a water-spray is used, the water shall be delivered to the spray-nozzle by a pump, and the water shall pass through a filtering device to protect the spray-nozzle from clogging by extraneous material. Provision shall be made for draining and cleaning all exhaust cooling boxes.

(2) *Discharge of exhaust gas.* (i) The final exhaust of the unit shall be discharged in such manner that it is not directed toward the operator's compartment, and shall be deflected so that persons alongside the unit do not encounter the exhaust at breathing level.

(ii) Provisions shall be made to dilute the exhaust gas with air before it is discharged from the machine into the surrounding atmosphere.

(3) *Provision for attachment of gage or gas-sampling equipment to exhaust system.* A connection shall be provided in the engine exhaust system between engine and exhaust cooling box for temporary attachment of a gage or gas-sampling equipment. This connection shall be internally threaded with standard pipe threads of a size not larger than half-inch, and is to be closed by a pipe-plug when not in use.

(f) *Composition of exhaust gas.* (1) Under normal operating conditions, and within the rated power output range the undiluted exhaust gas of the engine shall contain not more than 0.25 percent, by volume, of carbon monoxide.

(2) The exhaust gas after dilution with air shall contain not more than 100 parts per million, by volume, of carbon monoxide; 25 parts per million, by volume, of oxides of nitrogen (as equivalent nitrogen peroxide); or 10 parts per million, by volume, of aldehydes (as equivalent formaldehyde) under any condition of operation.

(g) *Fuel supply system*—(1) *Fuel tank.* (i) The fuel tank shall be fuel-tight and shall be of metal at least $\frac{1}{16}$ inch thick welded at all seams. The fuel tank shall be provided with a drain-plug (not a valve or pet cock) that shall be locked in position when inserted. The fuel tank shall be provided with a closure of such design that atmospheric pressure is maintained inside the tank and that discharge of liquid fuel is prevented. The closure shall be secured to the unit.

(ii) The fuel tank shall be mounted in the assembly of the unit in a position such that the tank is not subject to damage in ordinary use. No provision shall be made for attachment of separate or auxiliary fuel tanks to the unit.

(2) *Fuel lines.* All fuel lines to the engine and its accessory parts shall be installed so that they are not subject to damage in ordinary use, and shall be designed to resist breakage from vibration.

(3) *Valve in fuel line.* A readily accessible shut-off valve shall be included in the fuel line from the fuel tank.

(h) *Electrical equipment*—(1) *Automatic protection of electric circuits and parts.* (i) On equipment using storage batteries for starting of engines, each electric conductor from the battery to the starting motor shall be protected against short circuit by fuses or other suitable automatic circuit-interrupting devices placed at the battery unless conductors of adequate size are provided.

(ii) Fuses or other suitable automatic circuit-interrupting devices shall be inserted in each conductor of all branch circuits that are connected to the main circuit between the battery and charging generator. Headlight circuits and circuits for instruments and instrument panel lights are construed as being branch circuits.

(2) *Conductors, conduits, and wiring.* (i) Every ungrounded conductor shall have adequate insulation from "ground" and from conductors of opposite polarity. Insulation shall be selected with special reference to its

ability to resist deterioration from engine heat and oil.

(ii) It is recommended that all conductors have a current-carrying capacity of not less than 110 percent of the total current rating of the motor or other load connected to them. The basis for determining such carrying capacity shall be that given by the National Electrical Code for "allowable carrying capacities of wires."

(iii) All wiring shall have adequate mechanical and electrical protection to minimize fire hazards. If for any reason rigid conduit is unsuitable or undesirable, a good grade of rubber or equivalent air hose may be construed as meeting the requirement for mechanical protection if used where it will not be damaged by engine heat and oil. Flexible metal conduit is not recommended. All conduit ends must be adequately clamped or otherwise secured to prevent their being pulled out. Inserts should be used to prevent collapse of conduit ends that are secured by external clamps.

(iv) Sharp edges and corners shall be removed at all points where there is a possibility of damaging wires, cables, or conduits by cutting or abrasion.

(v) Wiring and conduits shall be well-cleated or otherwise held to prevent vibration and displacement.

(vi) The ends and terminal lugs of wires and cables shall be held or clamped in a manner that will minimize the possibility of the ends and lugs coming loose from their connections and swinging against metal walls or against parts of different potential.

(3) *Electrical clearances and insulation.* The clearance between live parts and casings of electric equipment shall be such as to minimize the possibility of arcs striking to the casings or, if space is limited, the casings shall be lined with adequate insulation.

(4) *Parts having special requirements*—(i) *Battery boxes and batteries.* Batteries that are not protected by position shall be enclosed in boxes or trays of material equivalent in strength to sheet steel not less than 3/16 inch in thickness or of wood reinforced with steel. Battery terminals shall be covered or shielded to prevent short circuiting by material falling on them while the equipment is in operation.

(ii) Covers, if used, shall be substantially constructed and, if made of metal, MSHA reserves the right to require nonbrittle insulating linings of adequate strength, quality, and dimensions, should the clearance over the battery terminals be in question. Ample openings for ventilation shall be provided to prevent accumulation of explosive hydrogen-air mixtures above the battery.

(iii) Unless the battery cells are insulated from the trays in an acceptable manner, the trays shall be insulated from any metal box or holder by means of rubber or equivalent insulators of adequate dimensions. For cells in metal containers mounted in "open" trays, a lining of wood or equally suitable insulation shall be provided under the trays. All wood and other insulating linings susceptible to damage by battery electrolyte shall be treated or painted with suitable material to resist such damage.

(iv) The number, type, rating, and manufacturer of the cells comprising the battery shall be specified.

(v) A diagram showing the connections between cells and between trays shall be submitted. The connections between cells and between trays shall be such that the maximum total battery potential will not be placed between any two adjacent cells.

[14 FR 1673, Apr. 8, 1949; 14 FR 3201, June 14, 1949, as amended by Supp. 1, 20 FR 2721, Apr. 23, 1955]

§ 32.5 Inspection and tests.

(a) *Inspection and tests of parts other than electrical*—(1) *Detailed inspection.* An inspection will be made by engineers of MSHA of all parts of the equipment covered by the requirements of this part or any other parts or features that are associated with safety in operation. This inspection will include the following items:

(i) A detailed inspection to determine the adequacy of materials, workmanship, and design.

(ii) A detailed comparison of parts or assemblies with drawings to check materials, dimensions, and position. Notes will be made of significant discrepancies that may exist between the drawings and the parts or assemblies. Satisfactory adjustment and correction of these discrepancies will be required before approval is granted.

(2) *Determination of composition of exhaust gas.* (i) The exhaust gas of the engine will be sampled while the engine is operating at minimum speed and at maximum rated speed. At both speeds the engine will be operated at minimum power output, at approximately one-half maximum rated power output, and at maximum rated power output. Under any of these test conditions the engine will be at temperature equilibrium before exhaust gas samples are collected or other test data recorded. Under each test condition rate of fuel consumption will be determined, and atmospheric pressure and temperature will be noted.

(ii) The exhaust gas samples will be analyzed for carbon dioxide, oxygen, carbon monoxide, hydrogen, methane, nitrogen, oxides of nitrogen, and aldehydes.

(3) *Maximum allowable fuel:air ratio.* (i) If the carbon monoxide content of the engine exhaust does not exceed 0.25 percent by volume throughout the rated range of speeds and power outputs, the manu- facturer's adjustment of the fuel injection equipment will be considered acceptable. The maximum fuel:air ratio (lb. of fuel/lb. of air) determined under this condition will be the maximum allowable fuel:air ratio.

(ii) If the carbon monoxide content of the exhaust exceeds 0.25 percent by volume only at or near maximum power output, the maximum fuel:air ratio will be determined at which the carbon monoxide content of the exhaust does not exceed 0.25 percent by volume, and this fuel:air ratio will be the maximum allowable fuel:air ratio. Adjustment of the fuel injection system may be made in the course of these tests to meet the requirement of maximum allowable fuel:air ratio.

(iii) In connection with establishment of maximum allowable fuel:air ratio, the barometric pressure existing during the tests and the maximum rate of fuel consumption at maximum allowable fuel:air ratio will be recorded as part of the requirements for operation of the equipment under recommended conditions. As stated in § 32.9, operation at barometric pressures significantly lower than that existing during tests to determine the maximum allowable fuel:air ratio will necessitate readjustment of the fuel injection system so that the maximum allowable fuel:air ratio is not exceeded as a result of the decrease in air density at the lower barometric pressure.

(4) *Determination of adequacy of exhaust gas cooling system.* The adequacy of the exhaust gas cooling system and its accessory parts will be determined with the engine operating at its maximum power output for a period sufficient for all parts of the engine and exhaust gas cooling system to reach their respective equilibrium temperatures.

The following determinations will be made:

(i) Exhaust gas temperature at outlet of exhaust manifold but upstream from cooling system;

(ii) Temperature at outlet of exhaust gas cooling system;

(iii) Cooling water consumed;

(iv) Temperature of water in all compartments.

The final exhaust gas temperature shall not exceed 160° F.

The water consumed in cooling the exhaust gas under the test conditions shall not exceed by more than approximately 15 percent that required for the adiabatic saturation of the exhaust gas at the outlet temperature of the exhaust gas cooler. The water consumed in excess of that required for adiabatic saturation at the outlet temperature of the cooler will be considered as entrained water.

(b) *Factory inspection and tests.* MSHA reserves the right to conduct inspections or tests of the mobile equipment, or any part thereof, at the plant of the manufacturer.

(c) *Additional tests.* MSHA reserves the right to make any additional tests, not covered by the provisions of this part, that may be considered necessary to determine the adequacy of the equipment, or any part thereof.

[14 FR 1674, Apr. 8, 1949, as amended by Supp. 1, 20 FR 2721, Apr. 23, 1955]

§ 32.6 Granting of approval.

(a) *Notification of approval or disapproval.* (1) After MSHA has considered the results of the investigation, and suitable drawings and specifications have been placed on file, a formal written notification of approval or disapproval of the equipment will be supplied to the applicant by MSHA. If the equipment meets all requirements, the notification of approval will not be accompanied by test data or detailed results of tests. If the equipment fails to meet any of the requirements, notification of such failure will be accompanied by details of the failure with a view to possible remedy of defects. MSHA will not otherwise release, or make public, results of tests of equipment that fails to meet the requirements.

(2) No verbal reports of MSHA's decisions concerning the investigation will be given, and no verbal, temporary, or informal approvals will be granted.

(3) The manufacturer shall not advertise his equipment as approved until he has received the formal notification of approval in which an approval number is assigned.

(4) All drawings and specifications that must be submitted to MSHA in connection with the investigation will be retained in confidential status by MSHA. A drawing list numbered to correspond to the approval number will accompany the notification of approval. This list will include the drawings and specifications covering the details of construction upon which the approval is based. The applicant receiving an approval shall keep exact duplicates of the drawings and specifications retained by MSHA. These are to be adhered to in commercial production of the approved equipment.

(b) *Approval plate.* (1) With the notification of approval the applicant will receive a photograph of a design of approval plate. The plate will bear the emblem of the Mine Safety and Health Administration, the approval number, designation of the type of equipment for which the approval is granted, and the name of the manufacturer. The plate will bear also a statement regarding proper operation and maintenance of the equipment.

(2) The manufacturer shall have this design reproduced as a plate for attachment to each approved unit. A sample plate and sketch or description of its proposed mounting on the unit shall be sent to Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, for approval before final adoption.

(c) *Purpose and significance of approval plate.* (1) The approval plate identifies the equipment as having met the requirements of MSHA for use in noncoal mines in which the concentration of flammable gas in the underground atmosphere is less than 0.25 percent by volume.

(2) The use of the approval plate on his equipment obliges the manufacturer to maintain the quality of his product and to see that each unit is constructed according to drawings and specifications accepted by, and on file with, MSHA. Each unit sold as approved shall carry an approval plate permanently attached to the unit. Equipment exhibiting changes in design that do not have official authorization from MSHA are not approved and therefore must not bear the approval plate.

[14 FR 1674, Apr. 8, 1949, as amended by Supp. 1, 20 FR 2721, Apr. 23, 1955; 43 FR 12317, Mar. 24, 1978]

§ 32.7 Withdrawal of approval.

MSHA reserves the right to rescind for cause, at any time, any approval granted under this part.

[14 FR 1675, Apr. 8, 1959]

§ 32.8 Changes in design subsequent to approval; extension of approval.

All approvals are granted with the understanding that the manufacturer will make his equipment according to final drawings and specifications submitted to MSHA. Therefore, before changing any feature of the equipment considered in the original approval, the manufacturer shall first obtain MSHA's approval of the change. This procedure is as follows:

(a) The manufacturer shall write to Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, requesting an extension of his original approval and describing the changes proposed. With this request he should submit a revised drawing or drawings and specifications showing the changes in detail.

(b) MSHA will consider the application and inspect the drawings and specifications to determine whether tests of the modified part or parts will be necessary.

(c) If tests are necessary, the applicant will be informed by MSHA of the amount of the fee and the material or parts required for the tests, and also will be informed, on the basis of the results of such tests, of the approval or disapproval of the proposed modification.

(d) If tests are unnecessary, the applicant will be informed by MSHA of the approval or disapproval of the proposed modification.

(e) If the proposed modification complies with the requirements of this part, under the provisions of either paragraph (c) or (d) of this section, formal written authorization, known as an extension of approval, allowing the modification will be issued to the applicant by MSHA. The letter notifying the applicant of extension of approval will be accompanied by a list of new and corrected drawings to be added to the list of official drawings relating to the equipment.

[14 FR 1675, Apr. 8, 1949, as amended by Supp. 1, 20 FR 2721, Apr. 23, 1955; 43 FR 12317, Mar. 24, 1978]

§ 32.9 Recommendations on the use of mobile diesel-powered equipment in noncoal mines.

The approval of any type of equipment by MSHA means that the equipment has met certain specified requirements of design, and performance, but the approval does not guarantee that it is impossible to use an approved device in an unsafe manner. The manufacturer must develop equipment that will meet these specified requirements to be granted an approval, but it is the responsibility of the user to see that the equipment is maintained in proper condition and is used in a proper manner.

The use of diesel equipment underground involves, in addition to proper maintenance of the equipment itself, certain other factors, such as ventilation, which are of equal importance in establishing safe operating conditions. The following recommendations on the use of diesel-powered equipment underground in noncoal mines are included in this part as an expression by MSHA of the conditions under which approved equipment should be used. The recommendations are as follows:

(a) *Ventilation*—(1) *Definition of ventilation requirements.* The use of diesel-powered equipment underground should be restricted to haulageways or other workings where positive ventilation is maintained by mechanical means. If possible the ventilation in places where diesel equipment is used should be arranged so that air carrying exhaust gases from the engine is returned to the surface without traversing working places. The quantity of ventilating air supplied must be adequate to dilute all toxic or objectionable constituents of the engine exhaust to such extent that the composition of the air of the haulageways, or any working place connected thereto, meets recognized hygienic standards for working environments. The air supplied for ventilation in places where diesel equipment is used should not contain combustible gas or other contaminant in such concentration that combustion processes in the engine may be altered, with resultant increase in production of toxic or objectionable constituents in the engine exhaust.

(2) *Quantity of ventilating air.* In the described approval tests of a diesel-powered unit, data will be obtained on the rate of production (cubic feet per minute) of toxic constitutents of the exhaust gas, such as carbon dioxide, carbon monoxide, and oxides of nitrogen, under conditions representing the range of rated engine speed and power output. These data will provide a basis for calculating the rate at which ventilating air should be supplied in the place where that diesel unit is used, so that under any normal operating condition the toxic gases produced by the engine will be diluted to limits acceptable in the air of working places. This recommended rate of ventilating (in cubic feet of air per

minute) will be shown upon the approval plate issued for the diesel unit. This rate applies to the use of one unit only; if more than one unit is used at a given location, or in any continuous course of air, then the rate of ventilation should be the sum of the requirements for the individual units. As this recommended rate of ventilation will be determined during the approval tests, with engines that are new and presumably in the best mechanical condition, it will be desirable to supply ventilation in excess of the rate indicated on the approval plate, thus furnishing a factor of safety in operation.

Measurements of air-flow should be made at intervals sufficiently frequent to insure that adequate ventilation is being maintained Records should be kept of such measurements.

(3) *Quality of ventilating air.* The air supplied for ventilation in connection with the use of diesel-powered equipment underground should contain at least 20 percent, by volume, of oxygen (dry basis); less than 0.25 percent flammable gas; and less than 0.5 percent carbon dioxide. This statement applies to the air current before the exhaust gases from the diesel equipment are added to it.

(4) *Examination of air at working places.* The air of places in which diesel-powered equipment is used should be examined at frequent intervals to determine that the composition of the intake air is within the limits given in paragraph (a)(3) of this section, and that the concentration of contaminants, such as carbon dioxide, carbon monoxide, and oxides of nitrogen added to this air by the equipment, are within acceptable limits. Methods used in determining the concentrations of these contaminants and the composition of the intake air should be sufficiently sensitive and accurate to produce reliable results, as the interpretation of these results may in some instances depend on variations in concentrations of as little as 0.01 percent or less. Concentrations of gases considered permissible in working environments are as follows:

Carbon dioxide (CO_2)—not more than 0.5 percent, by volume.

Carbon monoxide (CO)—not more than 0.01 percent, by volume.

Oxides of nitrogen (NO_2)—not more than 0.0025 percent, by volume.

Oxygen (O_2)—not less than 20 percent, by volume.

Ventilation and operating condition of diesel-powered equipment should be such that the composition of the air of haulageways, and working places connected thereto, always remains within these tolerable limits.

Aldehydes and smoke are self-evident if present in objectionable concentrations and need not be determined by analysis. Production of sulfur gases by the engine may be controlled by using a fuel-oil of low sulfur content.

A smoky exhaust is a good practical indication of faulty operation and usually accompanied by the production of excessive quantities of carbon monoxide. Therefore, abnormal production of smoke should be sufficient reason for removing diesel-powered equipment from service until this condition has been corrected.

In the event that any of the foregoing conditions of air quality are not maintained, as determined by analysis of the air or by observation, operation of the equipment should be stopped until proper conditions of air quality are established, either by increasing ventilation or by correcting mechanical imperfections in the equipment, whichever is found to be the cause of the undesirable conditions.

Records should be kept of all air analyses, and of any changes in ventilation or adjustments of equipment made as a result of these analyses.

(b) *Maintenance*—(1) *General.* The maintenance of diesel-powered equipment in approved condition is essential if undesirable conditions in the use of such equipment are to be avoided. To insure adequate maintenance, a person thoroughly familiar with the proper procedures for maintaining diesel-powered equipment in approved condition should be responsible for all maintenance work.

Inspection and maintenance procedures should be in accordance with the instructions furnished by the manufacturer. Records of all inspections should be kept and a routine inspection shcedule should be drafted from experience and information obtained in the inspections during the first several months of operation.

All maintenance work should be done in accordance with detailed instructions furnished by the manufacturer of the equipment. These instructions should form the basis of a routine inspection and maintenance schedule. Some of the more important inspection and maintenance procedures are summarized below.

(2) *Engine fuel-injection system*—(i) *Injection valves.* Improperly functioning injection valves may cause incomplete combustion of some of the fuel and lead to increased production of smoke, carbon monoxide, and aldehydes. It is important, therefore, to maintain injection valves in proper operating condition. Particular attention should be paid to injection valves to prevent leaking and to prevent imperfect atomization or distribution of the fuel.

The manufacturer's recommendations regarding inspection and maintenance of injection valves should be followed.

(ii) *Fuel pump.* The fuel pump on the engine is set by the manufacturer in accordance with approval requirements of MSHA. This setting is made to limit the fuel injected at full throttle and to prevent operation of the engine with insufficient air for complete combustion with the attendant production of dangerous quantities of carbon monoxide. After this adjustment is made, the fuel pump is sealed or locked to prevent alteration.

It should not be necessary to reset the fuel pump unless some part breaks or unless the pump is disassembled for a complete overhaul or unless the unit is to be operated at a barometric pressure significantly less than that for which the pump was set. When it is necessary to set the fuel pump, the seal or lock should be broken by an authorized person and the final adjustment should be made under the supervision of this person. After this adjustment has been made, the fuel pump should be sealed or locked by an authorized person.

(iii) *Method of adjusting fuel pump.* Adjustment of the fuel pump should be made preferably by the manufacturer of the engine. A spare pump should be available to permit this to be done. If this procedure is not followed and it becomes necessary to reset the stop limiting the fuel injected at full throttle, it is essential that some means be available for reproducing the original setting. Failure to reproduce the original setting may lead to the production of dangerous quantities of carbon monoxide if too much fuel is injected at full throttle. The fuel delivered at maximum throttle setting can be determined either by weight or by volume. If the determination is made by volume, a suitable correction for the density of the fuel at the existing temperature must be made. The test procedure should be designed so that the maximum quantity of fuel delivered per revolution of the fuel pump drive shaft can be determined. The fuel pump should be set to deliver no more than the maximum weight of fuel per revolution corresponding to the value specified by the manufacturer and shown on the approval plate for the particular engine and conditions of use.

(iv) *Adjustment of maximum fuel injection for operation at different barometric pressures.* The average barometric pressure existing at the place where a diesel engine is to be used must be considered in setting the maximum fuel injected. Barometric pressure affects the density of the air and therefore affects the weight of air drawn into the engine. Unless the quantity of fuel injected at full throttle is adjusted to maintain a constant fuel: air ratio, dangerous quantities of carbon monoxide may be produced at high altitude and low barometric pressure where the density of the air is low.

The maximum rate of fuel consumption for approved operation at different barometric pressures will be determined in approval tests made by MSHA. This information will be furnished the manufacturer and will be included on the approval plate. The fuel pump of the engine should be set in accordance with the values given for the barometric pressure existing at the place where the engine is to be operated.

(3) *Engine intake system.* The air cleaner should be maintained in accordance with the manufacturer's instructions. Abnormal reduced pressure in the intake system is likely to increase production of toxic or objectionable gases in the exhaust.

(4) *Engine exhaust system.* The exhaust system of the engine, including the cooling system, should be inspected at periodic intervals. The frequency of these inspections should be determined in accordance with the recommendations made under general maintenance instructions.

Operators of the equipment should be made responsible for maintaining an adequate supply of water in the exhaust gas cooling system. It is important that the water used in the exhaust gas cooling system be substantially free of acid to prevent corrosion. In some situations this might necessitate chemical treatment of the water used.

If the exhaust from the engine appears abnormally smoky or odorous, the manufacturer's manual of instructions should be consulted immediately and the cause determined. Particular attention should be paid to inspection of the fuel injection valves, the pressure in the intake and exhaust systems, and to the possibility of excessive injection of fuel at full throttle. Restrictions in the intake or excessive pressure in the exhaust can cause smoke and objectionable odor. This can be caused also by the injection of fuel in excess of the allowable maximum. A smoky exhaust usually is indicative of the presence of significant concentrations of carbon monoxide, and therefore steps should be taken immediately to determine the cause and eliminate it.

(5) *Electrical equipment*—(i) *Wiring.* Air hose, rigid steel, and other types of conduit should be firmly held at the ends, and also between ends when lengths are such as to require additional supports. Conduit and other means of affording mechanical protection of wiring should be kept intact and in place.

(ii) *Headlight and instrument lenses.* Lenses forming part of the casings of headlights and instruments should be held securely and protected to prevent damage to them.

(iii) *Overload protection.* Tampering with fuses, relays, and other means supplied by the manufacturer for overload and short-circuit protection of wiring and equipment should not be permitted, nor should substitutes that defeat this protection be allowed.

(iv) *Battery.* Battery cell tops should be kept free of electrolyte and dust. Connections between cells should be kept tight and free of corrosion

(c) *Fuel.* The fuel used for diesel-power equipment in underground service should conform to the manufacturer's specifications for viscosity, pour point, cetane number, carbon residue, and water. The flash point must not be less than 140° F. and the sulfur content should not be greater than 0.5 percent by weight.

Whenever possible fuel storage should be on the surface, and the fuel tanks of the diesel units should be filled above ground. In situations where this is not feasible, fuel stored underground should be limited in quantity to that required for one day's operation of the units. The fuel should be transported and stored in strong, tight containers provided with positive closing devices. All fuel taken underground, and awaiting transfer to the fuel tanks of the units, should be stored in a closed compartment, constructed of incombustible materials, and situated in well-ventilated places, the return air from which does not pass through any active workings. The walls of the compartment should form a liquid-tight joint with the floor, and no openings through the walls should be at a height less than that necessary to form a reservoir of greater capacity than the maximum volume of fuel that may be stored in the compartment. Fuel tanks of units should be filled only at the fuel storage compartment. A supply of sand or other suitable incombustible material should be at hand to absorb fuel that may be spilled accidentally in the filling operation.

Clean fuel is necessary to minimize the possibility of damage to the fuel-injection systems. Therefore in handling the fuel all precautions should be taken to keep the fuel clean and free from water.

(d) *Fire extinguishers.* At least one fire extinguisher of the type containing liquid carbon dioxide should be carried at all times with each unit. Extinguishers of the same type should be installed at underground fuel storage compartments, repair shops, and barns.

(e) *Repair shops and barns.* Repair shops for diesel-powered equipment and storage of such equipment preferably should be above ground. If such arrangement is impracticable, such spaces should be situated close to the shaft or portal underground and between an intake and a return air-way, so that persons in such places will be provided with fresh air, and so that if engines are operated in the repair shop, or if fire should occur, products of combustion will enter the return air.

Underground repair shops and storage spaces should be lined with incombustible material, and doors, or other closures, should be of incombustible material. The floor should be impervious to oil and should slope to a sump, so that spilled oil may be collected and removed. A supply of sand or other suitable incombustible material should be kept on hand to aid in fighting fires or to absorb spilled oil.

Welding or other operations that might create fire hazards should not be carried on in the repair shop unless adequate precautionary measures are taken against the ignition of diesel fuel or lubricants.

[14 FR 1675, Apr. 8, 1949]

§ 32.10 Revision of requirements and recommendations.

In the preparation of the requirements and recommendations embodied in this part MSHA has endeavored to provide a basis for the production of safe and practicable diesel-powered equipment that will meet the demands of existing conditions. However, it is possible that instances might arise in which the protection afforded would be inadequate. MSHA, with the cooperation of manufacturers and users of the equipment, will be alert to such situations. When a situation arises in which inadequacy of protection or unusual hazard attending the use of approved equipment is established, the manufacturer of the equipment will be requested to issue precautions or, if necessary, to cease marketing the equipment for use in the particular situation or condition until such changes or provisions as will provide adequate protection are made. It shall be understood that any changes or provisions made must be submitted to MSHA and have its approval before being adopted. Should the situation require a change in the basic requirements and tests provided in this part, or the recommendations contained therein, such change will be issued as a supplement to this part.

[14 FR 1677, Apr. 8, 1949]

PART 33—DUST COLLECTORS FOR USE IN CONNECTION WITH ROCK DRILLING IN COAL MINES

Subpart A—General Provisions

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Sec.
33.36 Method of drilling; combination unit or dust-collecting system.
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AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, secs. 201, 209, 212(a), 66 Stat. 692, 703, 709; 30 U.S.C. 3, 5, 7, 471, 479, 482(a); secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: Schedule 25B, 25 FR 6473, July 9, 1960, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12317, Mar. 24, 1978.

Subpart A—General Provisions

§ 33.1 Purpose.

The regulations in this part set forth the requirements for dust collectors used in connection with rock drilling in coal mines to procure their certification as permissible for use in coal mines; procedures for applying for such certification; and fees.

§ 33.2 Definitions.

As used in this part:

(a) "Permissible," as applied to a dust collector, means that it conforms to the requirements of this part, and that a certificate of approval to that effect has been issued.

(b) "Bureau" means the United States Bureau of Mines.

(c) "Certificate of approval" means a formal document issued by MSHA stating that the dust collector unit or combination unit has met the requirements of this part, and authorizing the use and attachment of an official approval plate or a marking so indicating.

(d) "Certificate of performance" means a formal document issued by MSHA stating that a dust-collecting system has met the test requirements of Subpart C of this part and therefore is suitable for use as part of permissible units.

(e) "Dust-collector unit" means a complete assembly of parts comprising apparatus for collecting the dust that results from drilling in rock in coal mines, and is independent of the drilling equipment.

(f) "Combination unit" means a rock-drilling device with an integral dust-collecting system, or mining equipment with an integral rock-drilling device and dust-collecting system.

(g) "Dust-collecting system" means an assembly of parts comprising apparatus for collecting the dust that results from drilling in rock and is dependent upon attachment to other equipment for its operation.

(h) "Applicant" means an individual, partnership, company, corporation, association, or other organization that designs and manufactures, assembles or controls the assembly of a dust-collecting system, dust-collector unit, or a combination unit, and seeks certification thereof.

(i) "MSHA" means the United States Department of Labor, Mine Safety and Health Administration.

[Sched. 25B, 25 FR 6473, July 9, 1960, as amended at 39 FR 24005, June 28, 1974; 43 FR 12317, Mar. 24, 1978]

§ 33.3 Consultation.

By appointment, applicants or their representatives may visit Approval and Certification Center, Box 201B Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, and discuss with qualified Bureau representative proposed designs of equipment to be submitted in accordance with the requirements of the regulations of this part. No charge is made for such consultation and no written report thereof will be submitted to the applicant.

[Sched. 25B, 25 FR 6473, July 9, 1960, as amended at 43 FR 12317, Mar. 24, 1978]

§ 33.4 Types of dust collectors for which certificates of approval may be granted.

(a) Certificates of approval will be granted only for completely assembled dust-collector or combination units; parts or subassemblies will not be approved.

(b) The following types of equipment may be approved: Dust-collector or combination units having components designed specifically to prevent dissemination of airborne dust generated by drilling into coal-mine rock strata in concentrations in excess of those hereinafter stated in § 33.33 as allowable, and to confine or control the collected dust in such manner that it may be removed or disposed of without dissemination into the mine atmosphere in quantities that would create unhygienic conditions.

§ 33.5 Fees for investigation.

(a) The following fees are charged for inspecting, testing, and certifying dust collectors:

1. Preliminary review of drawings, specifications, and related data, each unit or system	$60
2. Detailed inspection to determine adequacy of design and materials, each unit or system	60
3. Detailed inspection to determine adequacy of design and materials relating to changes subsequent to an initial investigation, per manday or fraction thereof	[1] 55
4. Drilling each set of 10 test holes:	
(i) First set of 10 test holes drilled, per investigation	170
(ii) Each additional set of 10 test holes drilled, per investigation	95
5. Final examination and recording of drawings and specifications, and issuing certificate of approval or certificate of performance	80
6. Examination and recording of drawings and specifications, and issuing extension of certificate of approval or certificate of performance	[2] 60
7. Design of approval plate of P/T label for certified equipment	25

[1] In addition the applicant shall reimburse MSHA for necessary travel and subsistence expenses of its representative(s) according to "Standardized Government Travel Regulations" when such MSHA representative(s) is required to be away from official headquarters.

[2] If only a nominal amount of work is required, the fee will be $40.

(b) Additional fees shall be charged in accordance with the provisions of Part 18 of Subchapter D of this chapter (Bureau of Mines Schedule 2, revised, the current revision of which is Schedule 2F) for examining and testing electrical parts of dust collectors required under § 33.38.

(c) The full fee must accompany an application for certification of a unit or dust-collecting system. The fees charged for each investigation will be in proportion to the work done, and any surplus will be refunded to the applicant.

(d) The fee for an extension of certification to cover modifications of equipment will be determined according to the work required and the applicant will be notified accordingly. The fee must be paid in advance before the investigation will be undertaken.

(e) If the applicant is uncertain as to the amount of fee that should be sent with his application, the information will be furnished him in writing upon request addressed to Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059.

[Sched. 25B, 25 FR 6473, July 9, 1960, as amended at 30 FR 3757, Mar. 23, 1965; 43 FR 12317, Mar. 24, 1978]

§ 33.6 Applications.

(a) No investigation or testing will be undertaken by MSHA except pursuant to a written application, in duplicate (except as othewise provided in paragraph (e) of this section), accompanied by a check, bank draft, or money order, payable to the U.S. Mine Safety and Health Administration, to cover the fees; and all prescribed drawings, specifications, and all related materials. The application and all related matters and all correspondence concerning it shall be sent to the Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059.

(b) The application shall specify the operating conditions (see § 33.22) for which certification is requested.

(c) Shipment of the equipment to be tested shall be deferred until MSHA has notified the applicant that the application will be accepted. Shipping instructions will be issued by MSHA and shipping charges shall be prepaid by the applicant. Upon completion of the investigation and notification thereof to the applicant by MSHA, the applicant shall remove his equipment promptly from the test site (see § 33.30).

(d) Drawings and specifications shall be adequate in number and detail to identify fully the design of the unit or system and to disclose its materials and detailed dimensions of all component parts. Drawings must be numbered and dated to insure accurate identification and reference to records, and must show the latest revision. Specifications and drawings, including a complete assembly drawing with each part that affects dust collection identified thereon, shall include:

(1) Details of all dust-collector parts. A manufacturer who supplies the applicant with component parts or subassemblies may submit drawings and specifications of such parts or subassemblies direct to MSHA instead of to the applicant. If the unit or system is certified, MSHA will supply the applicant with a list, in duplicate, of drawing numbers pertaining to such parts or subassemblies for identification purposes only.

(2) Details of the electrical parts of units designed to operate as face equipment (see § 33.38) in accordance with the provisions of Part 18 of Subchapter D of this chapter. (Bureau of Mines Schedule 2, revised, the current revision of which is Schedule 2F).

(3) Storage capacity of the various stages of dust collection in the dust separator.

(4) Net filter area in the dust separator, and complete specifications of the filtering material.

(e) If an application is made for certification of a dust-collector unit or a combination unit that includes electrical parts, and is designed to operate as electric face equipment, as defined in § 33.38, the application shall be in triplicate.

(f) The application shall state that the unit or system is completely developed and of the design and materials which the applicant believes to be suitable for a finished marketable product.

(g) The applicant shall furnish a complete unit or system for inspection and testing. Spare parts, such as gaskets and other expendable components subject to wear in normal operation, shall be supplied by the applicant to permit continuous operation during test periods. If special tools are necessary to disassemble any part for inspection or test, they shall be furnished by the applicant.

(h) Each unit or system shall be carefully inspected before it is shipped from the place of manufacture or assembly and the results of the inspection shall be recorded on a factory-inspection form. The applicant shall furnish MSHA with a copy of the factory-inspection form with his application. The form shall direct attention to the points that must be checked to make certain that all parts are in proper condition, complete in all respects, and in agreement with the drawings and specifications filed with MSHA.

(i) With the application the applicant shall furnish MSHA with complete instructions for operating and servicing the unit or system and information as to the kind of power required. After MSHA's investigation, if any revision of the instructions is required a revised copy thereof shall be submitted to MSHA for inclusion with the drawings and specifications.

OMB CONTROL No. 1219-0066. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[Sched. 25B, 25 FR 6473, July 9, 1960, as amended at 43 FR 12317, Mar. 24, 1978; 47 FR 14696, Apr. 6, 1982; 47 FR 28095, June 29, 1982]

§ 33.7 Date for conducting tests.

The date of acceptance of an application will determine the order of precedence for testing when more than one application is pending, and the applicant will be notified of the date on which tests will begin. If a unit or system fails to meet any of the requirements, it shall lose its order of precedence. If an application is submitted to resume testing after correction of the cause of failure, it will be treated as a new application and the order of precedence for testing will be so determined.

§ 33.8 Conduct of investigations, tests, and demonstrations.

(a) Prior to the issuance of a certificate of approval or performance, necessary government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon, may observe the investigations or tests. MSHA shall hold as confidential and shall not disclose principles or patentable features, nor shall it disclose any details of drawings, specifications, and related materials. After the issuance of a certificate, MSHA may conduct such public demonstrations and tests of the unit or system as it deems appropriate. The conduct of all investigations, tests, and demonstrations shall be under the direction and control of MSHA, and any other persons shall be present only as observers, except as noted in paragraph (b) of this section.

(b) When requested by MSHA, the applicant shall provide assistance in disassembling parts for inspection, preparing parts for testing, and operating combination units.

[Sched. 25B, 25 FR 6473, July 9, 1960, as amended at 39 FR 24005, June 28, 1974]

§ 33.9 Certification of dust-collecting systems.

Manufacturers of dust-collecting systems that are designed for integral use on machines with drilling equipment may apply to MSHA to issue a certificate of performance for such systems. To qualify for a certificate of performance, the dust-collecting system shall have met satisfactorily the test requirements of Subpart C under specified operating conditions, such as type of drilling equipment, drilling speed, and power requirements and the construction thereof shall be adequately covered by specifications and drawings officially recorded and filed with MSHA. Individual parts of dust-collecting systems will not be certified for performance. Certificates of performance may be cited to fabricators of combination units as evidence that further inspection and testing of the dust-collecting system will not be required, provided the dust-collecting requirements of the drilling equipment do not exceed the limits of performance for which the system was certified. Since MSHA does not sanction the use of the words "permissible" or "approved" except as applying to completely assembled equipment, dust-collecting systems, which have been certified only as to performance, shall not be advertised or labeled in a manner inferring that such systems themselves are permissible or approved by MSHA. However, a certified system may be advertised as suitable for use on combination units for which certification may be desired if the limits of its performance are cited. Certified dust-collecting systems shall bear labels or tags which shall contain the following: "Performance-tested Dust Collecting, System, MSHA File No. P/T——————," and name of manufacturer, identifying numbers of the dust-collector parts, and description of the limitations for which performance is certified. MSHA will assign a P/T file number in the certification letter.

§ 33.10 Certificates of approval or performance.

(a) Upon completion of an investigation, MSHA will issue to the applicant either a certificate or a written notice of disapproval, as they case may require. No informal notification of approval will be issued. If a certificate is issued, no test data or detailed results of tests will accompany it. If a notice of disapproval is issued, it will be accompanied by details of the defects, with a view to possible correction. MSHA will not disclose, except to the applicant, any information on a unit or system upon which a notice of disapproval has been issued.

(b) A certificate will be accompanied by a list of the drawings and specifications covering the details of design and construction of the unit or system, including the electrical parts, if applicable, upon which the certificate is based. Applicants shall keep exact duplicates of the drawings and specifications submitted and the list of drawing numbers referred to in § 33.6(d)(1) that relate to the certified unit or system, and these are to be adhered to exactly in production.

§ 33.11 Approval plates.

(a) A certificate of approval will be accompanied by a photograph of a design for an approval plate, bearing the emblem of the Mine Safety and Health Administration, the name of the applicant, the name of the unit, the approval number or space for the approval number (or numbers if permissibility of electrical parts is involved), spaces for the type and the serial numbers of the unit, conditions of approval, and identifying numbers of the dust-collector parts. When deemed necessary by MSHA, an appropriate statement shall be added, giving the precautions to be observed in maintaining the unit in an approved condition.

(b) An approval plate for a unit designed for use in a nongassy coal mine shall state that any electrical parts are not certified for use in a gassy coal mine. (See § 33.38(c).)

(c) The applicant shall reproduce the design either as a separate plate or by stamping or molding it in some suitable place on each unit to which it relates. The size, type, and method of attaching and location of an approval plate are subject to the approval of MSHA. The method of affixing the plate shall not impair the dust-collection or explosion-proof features of the unit.

(d) The approval plate identifies the unit, to which it is attached, as permissible, and is the applicant's guarantee that the unit complies with the requirements of this part. Without an approval plate, no unit has the status of "permissible" under the provisions of this part.

(e) Use of the approval plate obligates the applicant to whom the certificate of approval was granted to maintain the quality of each unit bearing it and guarantees that it is manufactured and assembled according to the drawings and specifications upon which a certificate of approval was based. Use of the approval plate is not authorized except on units that conform strictly with the drawings and specifications upon which the certificate of approval was based.

[Sched. 25B, 25 FR 6473, July 9, 1960, as amended at 43 FR 12317, Mar. 24, 1978]

§ 33.12 Changes after certification.

If an applicant desires to change any feature of a certified unit or system, he shall first obtain MSHA's approval of the change, pursuant to the following procedure:

(a) Application shall be made as for an original certificate, requesting that the existing certification be extended to cover the proposed changes, and shall be accompanied by drawings, specifications, and related data showing the changes in detail.

(b) The application will be examined by MSHA to determine whether inspection and testing will be required. Testing will be necessary if there is a possibility that the modification may affect adversely the performance of the unit or system. MSHA will inform the applicant whether such testing is required, the components or materials to be submitted for that purpose, and the fee.

(c) If the proposed modification meets the requirements of this part and Part 18 of Subchapter D of this chapter (Bureau of Mines Schedule 2, revised, the current revision of which is Schedule 2F) if applicable, a formal extension of certification will be issued, accompanied by a list of new and corrected drawings and specifications to be added to those already on file as the basis for the extension of certification.

§ 33.13 Withdrawal of certification.

MSHA reserves the right to rescind for cause, at any time, any certification granted under this part.

Subpart B—Dust-Collector Requirements

§ 33.20 Design and construction.

(a) MSHA will not test or investigate any dust collector that in its opinion is not constructed of suitable materials, that evidences faulty workmanship, or that is not designed upon sound engineering principles. Since all possible designs, arrangements, or combinations of components and materials cannot be foreseen, MSHA reserves the right to modify the tests specified in this part in such manner to obtain substantially the same information and degree of protection as provided by the tests described in Subpart C of this part.

(b) Adequacy of design and construction of a unit or system will be determined in accordance with its ability (1) to prevent the dissemination of objectionable or harmful concentrations of dust into a mine atmosphere, and (2) to protect against explosion and/or fire hazards of electrical equipment, except as provided in § 33.38(b).

§ 33.21 Modification of test equipment.

For test purposes the unit or system may be modified, such as by attaching instruments or measuring devices, at MSHA's discretion; but such modification shall not alter its performance.

§ 33.22 Mode of use.

(a) A unit or system may be designed for use in connection with percussion and/or rotary drilling in any combination of the following drilling positions: (1) Vertically upward, (2) upward at angles to the vertical, (3) horizontally, and (4) downward.

(b) Dust-collector units may be designed for use with specific drilling equipment or at specific drilling speeds.

§ 33.23 Mechanical positioning of parts.

All parts of a unit that are essential to the dust-collection feature shall be provided with suitable mechanical means for positioning and maintaining such parts properly in relation to the stratum being drilled.

Subpart C—Test Requirements

§ 33.30 Test site.

Tests shall be conducted at an appropriate location determined by MSHA.

[39 FR 24005, June 28, 1974]

§ 33.31 Test space.

(a) Drilling tests shall be conducted in a test space formed by two curtains suspended across a mine opening in such a manner that the volume of the test space shall be approximately 2,000 cubic feet.

(b) No mechanical ventilation shall be provided in the test space during a drilling test, except such air movement as may be induced by operation of drilling- or dust-collecting equipment.

(c) All parts of a unit or system shall be within the test space during a drilling test.

§ 33.32 Determination of dust concentration.

(a) Concentrations of airborne dust in the test space shall be determined by sampling with a midget impinger apparatus, and a light-field microscopic technique shall be employed in determining concentrations of dust in terms of millions of particles (5 microns or less in diameter) per cubic foot of air sampled.

(b) Before a drilling test is started the surfaces of the test space shall be wetted; the test space shall be cleared of air-borne dust insofar as practicable by mechanical ventilation or other means; and an atmospheric sample, designated as a control sample, shall be collected during a 5-minute period to determine residual airborne dust in the test space.

(c) A sample of airborne dust, designated as a test sample, shall be collected in the breathing zone of the drill operators during the drilling of each test hole. Time consumed in changing drill steel shall not be considered as drilling time and sampling shall be discontinued during such periods.

[Sched. 25B, 25 FR 6473, July 9, 1960, as amended at 26 FR 2599, Mar. 28, 1961]

§ 33.33 Allowable limits of dust concentration.

(a) The concentration of dust determined by the control sample shall be subtracted from the average concentration of dust determined by the test samples collected at each drill operator's position, and the difference shall be designated as the net concentration of airborne dust. Calculations of the average concentration of dust determined from the test samples shall be based upon the results of not less than 80 percent of each set of test samples.

(b) Under each prescribed test condition, the net concentration of airborne dust at each drill operator's position shall not exceed 10 million particles (5 microns or less in diameter) per cubic foot of air when determined in accordance with the method given in § 33.32(a).

[Sched. 25B, 25 FR 6473, July 9, 1960, as amended at 26 FR 2599, Mar. 28, 1961]

§ 33.34 Drilling test.

(a) A drilling test shall consist of drilling a set of 10 test holes, without undue delay, under specified operating conditions. When the test involves the control of dust from more than one drill, all the drills shall be used in the intended manner to complete the set of test holes.

(b) Holes shall be drilled to a depth of 4 feet plus or minus 2 inches and shall be spaced so as not to interfere with adjacent holes. Each hole may be plugged after completion.

(c) Receptacles and filters for collecting drill cuttings shall be emptied and cleaned before each drilling test is started.

(d) Holes designated as "vertical" shall be drilled to incline not more than 10 degrees to the vertical. Holes designated as "angle" shall be drilled to incline not less than 30 and not more than 45 degrees to the vertical. Holes designated as "horizontal" shall be drilled to incline not more than 15 degrees to the horizontal.

[Sched. 25B, 25 FR 6473, July 9, 1960, as amended at 26 FR 2599, Mar. 28, 1961]

§ 33.35 Methods of drilling; dust-collector unit.

(a) *General.* All drilling shall be done with conventional, commercial drilling equipment—pneumatic-percussion, hydraulic-rotary, and/or electric-rotary types—in accordance with the applicant's specifications.

(b) *Pneumatic-percussion drilling.* A stoper-type drill with a piston diameter of 2½ to 3 inches shall be used for roof drilling. A hand-held, sinker-type drill with a piston diameter of 2½ to 3 inches shall be used for down drilling and also for horizontal drilling, except that the drill shall be supported mechanically. Compressed air for operating the drill shall be supplied at a gage pressure of 85-95 pounds per square inch. Drill bits shall be detachable, cross type with hard inserts, and shall be sharp when starting to drill each set of 10 holes. In roof drilling, 1¼- and 1½-inch diameter drill bits shall be used; in horizontal and down drilling, 1¾-inch diameter bits shall be used. The drill steel shall be ⅞-inch hexagonal and of hollow type to permit the introduction of compressed air through the drill steel when necessary to clean a hole during drilling.

(c) *Rotary drilling.* A hydraulic-rotary drill with a rated drilling speed of 18 feet per minute free lift, capable of rotating drill steel at 900 revolutions per minute with 100 foot-pounds torque, and having a feed force of 7,000 pounds, shall be used for roof drilling. An electric-rotary drill, supported by a post mounting, with a rated drilling speed of 30 inches per minute and powered by a 2.25 horsepower motor, shall be used for horizontal drilling. For roof drilling, the bits shall be hard-tipped, 1⅜ and 1½ inches outside diameter, and 1¼-inch auger-type drill steel shall be used. For horizontal drilling, the bits shall be hard-tipped, 2 inches outside diameter, and 1¾-inch auger-type drill steel shall be used. Drill bits shall be sharp when starting to drill each set of 10 holes.

§ 33.36 Method of drilling; combination unit or dust-collecting system.

Drilling shall be conducted in accordance with the applicant's specifications and operating instructions. If special drill bits or drill steel are required, they shall be furnished to MSHA by the applicant. Otherwise the drill bit and drill steel requirements stated in paragraphs (b) and (c) of § 33.35 shall be complied with for all types of combination units or dust-collecting systems.

§ 33.37 Test procedure.

(a) Roof drilling: Drilling shall be done in friable strata, similar to the roof in the Bureau's Experimental Mine, which tends to produce large scale-like cuttings.

(b) Horizontal drilling: Drilling shall be done in strata comparable in hardness to that of coal-mine draw slate. Holes shall be started near the roof of the test space under conditions simulating the drilling of draw slate in coal mining.

(c) Down drilling: Drilling shall be done in typical mine floor strata with a pneumatic percussion-type drill. Five holes shall be drilled vertically and five holes shall be drilled at an angle.

(d) At MSHA's discretion drilling in "on site" strata may be acceptable in lieu of strata requirements in paragraphs (a), (b), and (c) of this section. (See § 33.20(a).)

§ 33.38 Electrical parts.

(a) Units with electrical parts and designed to operate as electric face equipment (see definition, § 45.44-1 of this chapter) in gassy coal mines shall meet the requirements of Part 18 of Subchapter D of this chapter (Bureau of Mines Schedule 2, revised, the current revision of which is Schedule 2F), and the examination and testing of the electrical parts shall be entirely separate from the examination and testing of dust-collecting equipment as such.

(b) Units with electrical parts designed to operate only outby the last open crosscut in a gassy coal-mine entry, room, or other opening (including electric-drive units with their controls and push buttons) are not required to comply with the provisions of Part 18 of Subchapter D of this chapter (Bureau of Mines Schedule 2, revised, the current revision of which is Schedule 2F).

(c) Units with electrical parts and designed for operation only in nongassy coal mines are not required to comply with the provisions of Part 18 of Subchapter D of this chapter (Bureau of Mines Schedule 2, revised, the current revision of which is Schedule 2F). (See § 33.11(b).)

PART 35—FIRE-RESISTANT HYDRAULIC FLUIDS

Subpart A—General Provisions

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Subpart B—Test Requirements

35.20 Autogenous-ignition temperature test.
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35.22 Test to determine effect of evaporation on flammability.
35.23 Performance required for certification.

AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended, secs. 201, 209, 212(a), 66 Stat. 692, 703, 709; 30 U.S.C. 3, 5, 7, 471, 479, 482(a); secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: Schedule 30, 24 FR 10201, Dec. 17, 1959, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12317, Mar. 24, 1978.

Subpart A—General Provisions

§ 35.1 Purpose.

The regulations in this part set forth the requirements for fire-resistant hydraulic fluids and concentrates for the production thereof to procure their certification as approved for use in machines and devices that are operated in coal mines; procedures for applying for such certification; and fees.

§ 35.2 Definitions.

As used in this part—

(a) "Permissible," as applied to hydraulic fluids, means that the fluid conforms to the requirements of this part, and that a certificate of approval to that effect has been issued.

(b) "MSHA" means the United States Department of Labor, Mine Safety and Health Administration.

(c) "Certificate of approval" means a formal document issued by MESA stating that the fluid has met the requirements of this part for fire-resistant hydraulic fluids and authorizing the use of an official identifying marking so indicating.

(d) "Fire-resistant hydraulic fluid" means a fluid of such chemical composition and physical characteristics that it will resist the propagation of flame.

(e) "Concentrate" means a substance in concentrated form that might not be fire resistant as such but when mixed with water or other vehicle in accordance with instructions furnished by the applicant will constitute a fire-resistant hydraulic fluid.

(f) "Applicant" means an individual, partnership, company, corporation, association, or other organization that manufactures, compounds, refines, or otherwise produces, a fire-resistant hydraulic fluid or a concentrate for the production thereof, and seeks a certificate of approval.

[Sched. 30, 24 FR 10201, Dec. 17, 1959, as amended at 39 FR 24005, June 28, 1974; 43 FR 12317, Mar. 24, 1978]

§ 35.3 Consultation.

By appointment, applicants or their representatives may visit Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, to discuss with qualified MSHA personnel proposed fluids to be submitted in accordance with the regulations of this part. No charge is made for such consultation and no written report thereof will be submitted to the applicant.

[Sched. 30, 24 FR 10201, Dec. 17, 1959, as amended at 43 FR 12317, Mar. 24, 1978]

§ 35.4 Types of hydraulic fluid for which certificates of approval may be granted.

Certificates of approval will be granted for completely compounded or mixed fluids and not for individual ingredients; except that when a concentrate is submitted for testing, complete instructions for mixing with water or other vehicle shall be furnished to MSHA, together with the vehicle other than water, and the approval will cover only the specific mixture that constitutes the hydraulic fluid for use in coal mines.

§ 35.5 Fees for investigation.

(a) The full fee must accompany an application for testing a hydraulic fluid or for retesting a fluid that has been previously tested and disapproved. If less work is involved than for a complete investigation, the charge will be in proportion to the work done. Any surplus will be refunded to the applicant.

(b) The fee for tests covering only part of a complete investigation will be charged according to the work involved and will be in proportion to that charged for a complete investigation. The fee for such tests shall be determined in advance by MSHA and the applicant notified accordingly in writing.

(c) The fee for an extension of certification will be determined according to the work required and the applicant will be notified accordingly. The fee must be paid in advance before the investigation will be undertaken.

(d) The following fees are charged for testing a hydraulic fluid—concentrate or emulsion:

1. Autogenous-ignition temperature test, each	$55
2. Temperature-pressure spray-ignition test, each	100
3. Test to determine effect of exaporation on flammability, each	65
4. Fees for other tests not included in the above list will be determined in advance by MSHA. The applicant will be notified accordingly, and the fee shall be paid before such tests are begun.	

[Sched. 30, 24 FR 10201, Dec. 17, 1959, as amended at 30 FR 3757, Mar. 23, 1965]

§ 35.6 Applications

(a) No investigation or testing will be undertaken by MSHA except pursuant to a written application, in duplicate, accompanied by a check, bank draft, or money order, payable to the U.S. Mine Safety and Health Administration, to cover the fees; and all descriptions, specifications, test samples, and related materials. The application and all related matters and correspondence concerning it shall be sent to Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059.

(b) Descriptions and specifications shall be adequate in detail to identify fully the composition of the hydraulic fluid and to disclose its characteristics. Descriptions and specifications shall include:

(1) An identifying name or number of the fluid or concentrate for the production thereof.

(2) Pour point, ° F.; freezing point, ° F.; color; neutralization number or pH; viscosity at 100° F., 150° F., 175° F. (Saybolt or Furol); viscosity index; specific gravity.

(3) A statement of the water or other vehicle content in percent by weight or volume and how it affects fire resistance of the hydraulic fluid. If water is the vehicle, the statement shall include the applicant's method for determining water content quickly in the field.

(c) The application shall state whether the fluid submitted for test is toxic or irritating to the skin and what precautions are necessary in handling it.

(d) The application shall state that the applicant has tested the fluid which he believes to have fire-resistant properties, the basis for such determination, and submit with his application the data resulting from the applicant's use or laboratory tests to determine the fire-resistant properties of the fluid.

(e) The application shall contain evidence that the fluid has lubricating and hydraulic properties and is satisfactory for use in underground mining machinery; and shall state that the fluid, or concentrate for the production thereof, is fully developed and is of the composition that the applicant believes to be a suitable marketable product.

(f) The application shall state the nature, adequacy, and continuity of control of the constituents of the fluid to maintain its fire-resistant characteristics and how each lot will be sampled and tested to maintain its protective qualities. MSHA reserves the right to have its qualified representative(s) inspect the applicant's control-test equipment, procedures, and records, and to interview the personnel who conduct the control tests to satisfy MSHA that the proper procedure is being followed to insure that the fire-resistant qualities of the hydraulic fluid are maintained.

(g) When MSHA notifies the applicant that the application will be accepted, it will also notify him as to the number of samples and related materials that will be required for testing. Ordinarily a 5-gallon sample of hydraulic fluid will be required provided that it is a finished product or, if in concentrate form, enough shall be furnished to make a 5-gallon sample when mixed with water or other vehicle according to the applicant's instructions. All samples and related materials required for testing must be delivered (charges prepaid) to Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059.

[Sched. 30, 24 FR 10201, Dec. 17, 1959, as amended at 43 FR 12317, Mar. 24, 1978]

§ 35.7 Date for conducting tests.

The date of acceptance of an application will determine the order of precedence for testing when more than one application is pending, and the applicant will be notified of the date on which tests will begin. However, not more than two fluids will be tested consecutively for one applicant provided other applications are pending. If a fluid fails to meet any of the requirements, it shall lose its order of precedence. If an application is submitted to resume testing after correction of the course of failure, it will be treated as a new application and the order of precedence for testing will be so determined.

§ 35.8 Conduct of investigations, tests, and demonstrations.

Prior to the issuance of a certificate of approval, necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon, may observe the investigations or tests. MSHA shall hold as confidential and shall not disclose features of this hydraulic fluid such as the chemical analysis, specifications, descriptions, and related material. After issuing a certificate of approval MSHA may conduct such public demonstrations and tests of the approved hydraulic fluid as it deems appropriate. The conduct of all investigations, tests, and demonstrations shall be under the direction and control of MSHA, and any other persons shall be present only as observers.

[Sched. 30, 24 FR 10201, Dec. 17, 1959, as amended at 39 FR 24005, June 28, 1974]

§ 35.9 Certificates of approval.

(a) Upon completion of an investigation of a hydraulic fluid MSHA will issue to the applicant either a certificate of approval or a written notice of disapproval as the case may require. No informal notification of approval will be issued. If a certificate of approval is issued, no test data or detailed results of tests will accompany it. If a notice of disapproval is issued, it will be accompanied by details of the defect(s), with a view to possible correction. MSHA will not disclose, except to the applicant, any information on a fluid upon which a notice of disapproval has been issued.

(b) A certificate of approval will be accompanied by a list of specifications covering the characteristics of a hydraulic fluid upon which the certificate of approval is based. In addition to the applicant's record of control in maintaining the fire-resistant characteristics, applicants shall keep exact duplicates of the specifications that have been submitted to MSHA and that relate to any fluid which has received a certificate of approval; and these are to be adhered to exactly in production of the certified fluid for commercial purposes.

§ 35.10 Approval labels or markings.

(a) A certificate of approval will be accompanied by a photograph of a design for an approval label or marking, which shall bear the emblem of the Mine Safety and Health Administration and shall be inscribed substantially as follows:

PERMISSIBLE FIRE-RESISTANT HYDRAULIC FLUID

MSHA Approval No. ——————————
Issued to ——————————————
(Name of Applicant)

(b) A label so inscribed shall be attached to each fluid container in such a manner that it cannot be easily removed or containers may be so marked with a metal stencil. The letters and numbers shall be at least ½ inch in height and of a color which contrasts with that of the container.

(c) For a concentrate the label or marking shall clearly indicate that the certification thereof applies only when the concentrate is used in exact conformance with the instructions on such label or marking. The label or marking shall clearly indicate the exact amount of water or other vehicle to make the fire-resistant hydraulic fluid upon which the certificate of approval was based.

(d) Appropriate instructions and caution statements on the handling of the hydraulic fluid or concentrate shall be included on the approval label or marking.

(e) Use of MSHA's approval label or marking obligates the applicant to whom the certificate of approval was granted to maintain the fire-resistant characteristics of the hydraulic fluid and guarantees that it is manufactured according to the specifications upon which the certificate of approval was based. Use of the approval label or marking is not authorized except on containers of hydraulic fluids that conform strictly with the specifications and characteristics upon which the certificate of approval was based.

[Sched. 30, 24 FR 10201, Dec. 17, 1959, as amended at 43 FR 12317, Mar. 24, 1978]

§ 35.11 Material required for record.

MSHA may retain for record all or part of the material submitted for testing. Any material that MSHA does not require will be returned to the applicant at his expense upon receipt of his written request and shipping instructions not more than 6 months after the termination or completion of the tests. Thereafter MSHA will dispose of such surplus material as it deems appropriate.

§ 35.12 Changes after certification.

If an applicant desires to change any specification or characteristic of a certified hydraulic fluid, he shall first obtain MSHA's approval of the change, pursuant to the following procedures:

(a) Application shall be made, as for an original certificate of approval, requesting that the existing certification be extended to cover the proposed change. The application shall be accompanied by specifications and related material(s) as in the case of an original application.

(b) The application and related material(s) will be examined by MSHA to determine whether testing of the modified hydraulic fluid will be required. Testing will be necessary if there is a possibility that the modification may affect adversely the performance characteristics of the fluid. MSHA will inform the applicant in writing whether such testing is required, and the fee.

(c) If the proposed modification meets the requirements of this part, a formal extension of certification will be issued, accompanied by a list of new and corrected specifications to be added to those already on file, as the basis for the extension of certification.

§ 35.13 Withdrawal of certification.

MSHA reserves the right to rescind for cause, at any time, any certificate of approval granted under this part.

Subpart B—Test Requirements

§ 35.20 Autogenous-ignition temperature test.

(a) *Purpose.* The purpose of this test, referred to hereinafter as the ignition-temperature test, is to determine the lowest autogenous-ignition temperature of a hydraulic fluid at atmospheric pressure when using the syringe-injection method.

(b) *Description of apparatus*—(1) *test flask.* The test flask, which is heated and into which the test sample is injected, shall be a commercial 200 ml. borosilicate glass Erlenmeyer flask.

(2) *Thermocouples.* Calibrated thermocouples—iron-constantan or chromelalumel—and a potentiometer shall be used for all temperature measurements.

(3) *Syringe.* A hypodermic syringe (0.25 or 1 cc. capacity) equipped with a 2-inch No. 18 stainless steel needle and calibrated in hundredths of a cubic centimeter (0.01 cc.) shall be used to inject samples into the heated test flask.

(4) *Timer.* An electric timer or stopwatch calibrated in not more than 0.2 second intervals shall be used to determine the time lag before ignition.

NOTE: Time lag is the time that elapses between the instant of injection and that of ignition of the test sample, as evidenced by flame.

(5) *Furnace.* The furnace in which the ignition-temperature test is conducted shall consist of a refractory (alundum or equivalent) cylinder 5 inches in internal diameter and 5 inches in height; a transite-ring top and a transite-disk bottom, each of which is attached to a metal cylinder. The furnace is heated by three elements as follows: (i) A circumferential heater embedded in the refractory cylinder; (ii) a top or toroidal-neck heater that surrounds the neck of the test flask; and (iii) a flat base heater on which the test flask rests. The temperature of each heating element shall be controlled independently by an autotransformer. Means shall be provided for applying thermocouples at the neck, mid-section, and base of the test flask, which shall be inserted upright in the furnace.

(c) *Test procedures*—(1) *Temperature control.* Each autotransformer shall be so adjusted that the temperature at the neck, mid-section, and base of the test flask is uniform within ±2° F. of the desired test temperature.

(2) *Sample injection and timing.* A 0.07 cc. test sample shall be injected into the heated test flask with the hypodermic syringe, and the syringe shall be withdrawn immediately. Measurement of time shall start at the instant the sample is injected.

(3) *Observations.* (i) If flame does not result in 5 minutes or more after injection of the test sample, the sample shall be considered nonflammable at the test temperature, and the timer shall be stopped. The test flask shall then be flushed well with clean dry air and, after a lapse of 15 minutes or more, the test shall be repeated with the test flask temperature raised 50° F. ±2° F. above the first test temperature.

(ii) If ignition (flame) is observed in 5 minutes or less after the injection of the test sample (0.07 cc.), the time lag (time interval) shall be noted. After an ignition occurs the temperature of the test flask shall be reduced 5° F., and the test procedure repeated in decrements of 5° F. until ignition no longer occurs and this temperature shall be noted as the first nonignition test temperature for the 0.07 cc. sample.

(iii) The temperature shall be increased 50° F. ±2° F. above the first nonignition test temperature, and the ignition-temperature test procedure shall be repeated with a 0.10 cc. test sample injected into the heated test flask.

(iv) If the lowest temperature at which ignition occurs with the 0.10 cc. sample (in decrements of 5° F.) is lower than that obtained with the 0.07 cc. sample, the ignition-temperature test procedure shall be repeated using a test sample of 0.12 cc., then 0.15 cc., and so on by increments of 0.03 cc. until the lowest ignition temperature is obtained.

(v) If the lowest temperature at which ignition is obtained with the 0.10 cc. sample is greater than that obtained with the 0.07 cc. sample, the ignition temperature test procedure shall be repeated by reducing the test sample to 0.05 cc. and then to 0.03 cc. until the lowest ignition temperature is obtained.

(d) *Appraisal of test.* A fluid shall be considered fire-resistant, according to the test requirements of this section: *Provided,* That in no instance of the ignition-temperature test procedure, as stated in this section, shall the ignition temperature of the test sample be less than 600° F.

§ 35.21 Temperature-pressure spray-ignition tests.

(a) *Purpose.* The purpose of this test shall be to determine the flammability of a hydraulic fluid when it is sprayed over three different sources of ignition which are described in paragraph (b)(4) of this section.

(b) *Description of apparatus.* (1) A 3-quart pressure vessel, with the necessary connections, valves, and heating elements, shall be used for containing and heating the fluid under the test conditions as specified hereinafter.

(2) An atomizing round-spray nozzle, having a discharge orifice of 0.025-inch diameter, capable of discharging 3.28 gallons of water per hour with a spray angle of 90 degrees at a pressure of 100 p.s.i., shall be connected to the pressure vessel.

(3) A commercial pressurized cylinder, containing nitrogen with the customary regulators, valves, tubing, and connectors, shall be used to supply nitrogen to the pressure vessel described in paragraph (b) (1) of this section.

(4) Three igniting devices shall provide three different sources of ignition as follows:

(i) A metal trough with a metal cover in which cotton waste soaked in kerosene is ignited.

(ii) An electric arcing device in which the arc is produced by a 12,000-volt transformer.

(iii) A propane torch—Bernzomatic or equivalent.

(5) A means of measuring distances from the nozzle tip to the igniting device shall be provided.

(c) *Test procedures.* (1) A 2½-quart sample of the fluid shall be poured into the pressure vessel and heated to a temperature of 150° F. The temperature shall be maintained at not less than 145° F. or not more than 155° F. during the test.

(2) Nitrogen shall be introduced into the vessel at 150 p.s.i.g.

(3) The fluid shall be sprayed at each igniting device, described in paragraph (b) (4) of this section, which is moved along the trajectory of the spray. Each igniting device shall be held in the spray at different distances from the nozzle tip for one minute or until the flame or arc is extinguished (if less than one minute) to determine this fire-resistant characteristic of the fluid.

(d) *Appraisal of tests.* If the test procedures in paragraph (c) of this section do not result in an ignition of any sample of fluid or if an ignition of a sample does not result in flame propagation for a time interval not exceeding 6 seconds at a distance of 18 inches or more from the nozzle tip to the center of each igniting device, it shall be considered fire resistant, according to the test requirements of this section.

§ 35.22 Test to determine effect of evaporation on flammability.

(a) *Purpose.* The purpose of this test shall be to determine the effect of evaporation on the reduction of fire resistance of a hydraulic fluid.

(b) *Description of apparatus*—(1) *Petri dish.* Standard laboratory Petri dishes, approximately 90 mm. by 16 mm., shall be used to contain the test samples.

(2) *Oven.* A gravity convection air oven, capable of maintaining the specified evaporation temperature constant within ±2°F., shall be used in the test.

(3) *Pipe cleaner.* An ordinary smoker's pipe cleaner (U.S. Tobacco Co., Dill's or equivalent) shall be used in the test procedure, described in paragraph (c) of this section.

(c) *Test procedures.* (1) Three 30-milliliter samples of the fluid shall be placed in uncovered Petri dishes. Two of these samples shall be inserted in the oven, that shall have been heated to a temperature of 150° F., ±2°F., which shall be maintained throughout this test. The third sample shall remain at room temperature.

(2) An electrically operated cycling device, such as an automobile windshield wiper mechanism, shall be oscillated in a horizontal plane, 25±2 cycles per minute. A pipe cleaner shall be attached to the device so that it will enter and leave a flame of a standard (Bunsen or equivalent) laboratory burner, which is adjusted to provide a nonluminous flame approximately 4 inches in height without forming a sharp inner cone. The cycling device shall be so arranged that when a 2-inch length of pipe cleaner is attached thereto the exposed end shall describe an arc with a radius of 4 inches ±⅛ inch. The cycling device shall be so arranged that when the 2-inch length of pipe cleaner is attached thereto, its midpoint shall be in the center of the flame at one extreme end of the cycle.

(3) Each of five 2-inch lengths of pipe cleaner shall be soaked separately for a period of 2 minutes in the test sample that remained at room temperature. Each pipe cleaner shall then be removed from the test sample and permitted to drain freely until all excess fluid is expelled from it. Each soaked pipe cleaner shall be attached to the cycling device, the mechanism started, and the pipe cleaner permitted to enter and leave the burner flame, as described in paragraph (c)(2) of this section, until a self-sustaining flame shall be observed on the pipe cleaner. The number of cycles necessary to obtain a self-sustaining flame shall be noted and averaged for each of the five soaked pipe cleaners.

(4) After one test sample has remained in the oven for a period of 2 hours, the Petri dish containing it shall be removed from the oven and allowed to cool to room temperature, after which 5 lengths of 2-inch pipe cleaner shall be soaked separately in the test sample for a period of 2 minutes. Then the test procedure stated in paragraph (c)(3) of this section shall be repeated.

(5) After one test sample has remained in the oven for a period of 4 hours, the Petri dish containing it shall be removed from the oven and allowed to cool to room temperature, after which 5 lengths of 2-inch pipe cleaner shall be soaked separately in the test sample for a period of 2 minutes. Then the test procedure stated in paragraph (c)(3) of this section shall be repeated.

(d) *Appraisal of tests.* To be determined as fire resistant according to the test requirements of this section, the three following results shall be achieved:

(1) The average number of cycles before attaining a self-sustaining flame in the test described in paragraph (c)(3) of this section shall be 24 or more.

(2) The average number of cycles before attaining a self-sustaining flame in the test described in paragraph (c)(4) of this section shall be 18 or more.

(3) The average number of cycles before attaining a self-sustaining flame in the test described in paragraph (c)(5) of this section shall be 12 or more.

§ 35.23 Performance required for certification.

To qualify as fire-resistant under the regulations of this part, a hydraulic fluid shall meet each performance requirement and stated in §§ 35.20(d), 35.21(d), and 35.22(d).

PART 36—MOBILE DIESEL-POWERED TRANSPORTATION EQUIPMENT FOR GASSY NONCOAL MINES AND TUNNELS

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AUTHORITY: Secs. 2, 3, 5, 36 Stat. 370, as amended; 30 U.S.C. 3, 5, 7; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: Schedule 31, 26 FR 645, Jan. 24, 1961, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12318, Mar. 24, 1978.

Subpart A—General Provisions

§ 36.1 Purpose.

The regulations in this part set forth the requirements for mobile diesel-powered transportation equipment to procure their approval and certification as permissible for use in gassy noncoal mines and tunnels; procedures for applying for such certification; and fees.

§ 36.2 Definitions.

As used in this part:

(a) "Mobile diesel-powered transportation equipment" means equipment that is (1) used for transporting the product being mined or excavated, or for transporting materials and supplies used in mining or excavating operations; (2) mounted on wheels or crawler treads (tracks); and (3) powered by a diesel engine as the prime mover.

(b) "Permissible", as applied to mobile diesel-powered transportation equipment, means that the complete assembly conforms to the requirements of this part, and that a certificate of approval to that effect has been issued.

(c) "MSHA" means the United States Department of Labor, Mine Safety and Health Administration.

(d) "Certificate of approval" means a formal document issued by MSHA stating that the complete assembly has met the requirements of this part for mobile diesel-powered transportation equipment and authorizing the use and attachment of an official approval plate so indicating.

(e) "Applicant" means an individual, partnership, company, corporation, association, or other organization, that designs, manufactures, assembles, or controls the assembly and that seeks a certificate of approval or preliminary testing of mobile diesel-powered transportation equipment for use in gassy noncoal mines and tunnels.

(f) "Noncoal mine" means an underground mine or tunnel in which the product being mined or excavated is incombustible.

(g) "Gassy noncoal mine" means a noncoal mine or tunnel in which flammable gas has been ignited, or in which a concentration of 0.25 percent or more, by volume, of flammable gas has been detected in the atmosphere of any open workings.

(h) "Diesel engine" means a compression-ignition, internal-combustion engine that utilizes a low-volatile hydrocarbon (diesel) fuel.

(i) "Low-volatile hydrocarbon (diesel) fuel" means a liquid fuel which has an open-cup flash point of 140° F. or more and a sulfur content of 0.5 percent or less by weight.

(j) "Component" means a piece, part, or fixture of mobile diesel-powered transportation equipment that is essential to its operation as a permissible assembly.

(k) "Subassembly" means a group or combination of components.

(l) "Explosion proof" means that a component or subassembly is so constructed and protected by an enclosure and/or flame arrester(s) that if a flammable mixture of gas is ignited within the enclosure it will withstand the resultant pressure without damage to the enclosure and/or flame arrester(s). Also the enclosure and/or flame arrester(s) shall prevent the discharge of flame or ignition of any flammable mixture that surrounds the enclosure.

(m) "Flammable mixture" means a mixture of gas, such as methane, natural gas, or similar hydrocarbon gas with normal air, that will propagate flame or explode violently when initiated by an incendive source.

(n) "Flame arrester" means a device so constructed that flame or sparks from the diesel engine cannot propagate an explosion of a flammable mixture through it.

(o) "Normal operation" means that each component and the entire assembly of the mobile diesel-powered transportation equipment performs the functions for which they were designed.

(p) "Fuel-air ratio" means the composition of the mixture of fuel and air in the combustion chamber of the diesel engine expressed as weight—pound of fuel per pound of air.

[Sched. 31, 26 FR 645, Jan. 24, 1961, as amended at 39 FR 24006, June 28, 1974; 43 FR 12318, Mar. 24, 1978]

§ 36.3 Consultation.

By appointment, applicants or their representatives may visit Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059, to discuss with qualified MSHA personnel proposed mobile diesel-powered transportation equipment to be submitted in accordance with the regulations of this part. No charge is made for such consultation and no written report thereof will be submitted to the applicant.

[Sched. 31, 26 FR 645, Jan. 24, 1961, as amended at 43 FR 12318, Mar. 24, 1978]

§ 36.4 Mobile diesel-powered transportation equipment for which certificates of approval may be granted.

Certificates of approval will be granted for completely assembled mobile diesel-powered transportation equipment only. Subassemblies or components may be granted letters of certification in accordance with § 36.5.

§ 36.5 Letters of certification.

When a component or subassembly meets all of the applicable requirements of Subparts B and C of this part, and also its normal operation will not be affected by connection to adjacent components or subassemblies, MSHA will issue to the applicant, upon his request, a letter of certification informing him that additional inspection or tests of the component or subassembly will not be required when it is incorporated without modification in a piece of completely assembled mobile diesel-powered transportation equipment. The applicant may cite this letter of certification to another applicant who seeks approval and certification of his completely assembled mobile diesel-powered transportation equipment and who desires to incorporate the component or subassembly in such equipment.

§ 36.6 Applications.

(a) No investigation or testing will be undertaken by MSHA except pursuant to a written application, in duplicate, accompanied by a check, bank draft, or money order, payable to the U.S. Mine Safety and Health Administration, to cover the fees; and all drawings, specifications, descriptions, and related materials. The application and all related matters and correspondence concerning it shall be addressed to the Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059.

(b) Drawings, specifications, and descriptions shall be adequate in detail to identify fully the complete assembly, components, and subassemblies. Drawings, specifications, and descriptions shall include:

(1) Assembly drawing(s) showing the overall dimensions of the equipment, location and capacity of the fuel tank, location of flame arresters, exhaust-gas conditioner and its water-supply tank, if applicable, exhaust-gas dilution system, and other details that are essential to the functioning of the equipment.

(2) Detailed drawings showing the intake, combustion, and exhaust systems of the diesel engine, including joints and gaskets; the turbulence or precombustion chamber, if applicable; injector assembly and nozzle details; and any surfaces that form the combustion chamber or part thereof, such as the cylinder head, piston and cylinder liner; and other features that may affect permissibility, such as exhaust-gas conditioner and flame arresters.

(3) A schematic drawing of the fuel system showing piping, connections, fuel filters, fuel-injection pump, and mechanical governor assembly. All components shall be identified to permit adjustment, as necessary, and the location of seals or locks to prevent tampering shall be indicated.

(4) Drawing(s) specifying the kind of material and detailed dimensions of the components of explosion-proof enclosures, including joints and openings.

(5) Drawing(s) showing the construction of headlights, battery boxes, including seals or locks, and method of mounting.

(6) Other drawings, specifications, or descriptions identifying any feature that MSHA considers necessary for certification of the particular mobile diesel-powered transportation equipment.

(c) Shipment of the mobile diesel-powered transportation equipment or component part or subassembly as the case may be, shall be deferred until MSHA has notified the applicant that the application will be accepted. Shipping instructions will be issued by MSHA and shipping charges shall be prepaid by the application. Upon completion of the investigation and notification thereof to the applicant by MSHA, the applicant shall remove his equipment promptly from the test site (see § 36.40).

(d) The application shall state that the equipment is completely developed and of the design and materials that the applicant believes to be suitable for a finished marketable product or is a completely developed component or subassembly suitable for incorporation in a finished marketable complete assembly of mobile diesel-powered transportation equipment. If the final design of a component depends upon results of MSHA's tests, this shall be so stated in the application.

(e) For a complete investigation leading to approval and certification, the applicant shall furnish a complete operable assembly for inspecting and testing. Spare parts and expendable components, subject to wear in normal operation, shall be supplied by the applicant to permit continuous operation of the equipment during test periods. If special tools are necessary to disassembly any component for inspection or test, the applicant shall furnish these with the equipment to be tested.

(f) With each application, the applicant shall submit evidence of how he proposes to inspect his completely assembled mobile diesel-powered transportation equipment at the place of manufacture or assembly before shipment to purchasers. Ordinarily such inspection is recorded on a factory inspection form and the applicant shall furnish to MSHA a copy of his factory inspection form or equivalent with his application. The form shall direct attention to the points that must be checked to make certain that all components of the assembly are in proper condition, complete in all respects, and in agreement with the drawings, specifications, and descriptions filed with MSHA.

(g) With the application, the applicant shall furnish to MSHA complete instructions for operating and servicing his equipment. After completing MSHA's investigation, if any revision of the instructions is required, a revised copy thereof shall be submitted to MSHA for inclusion with the drawings and specifications.

OMB Control No. 1219-0066. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[Sched. 31, 26 FR 645, Jan. 24, 1961, as amended at 43 FR 12318, Mar. 24, 1978; 47 FR 14696, Apr. 6, 1982]

§ 36.7 Fees.

(a)

1. Preliminary review of drawings, specifications, descriptions, and related data, each complete assembly	$50
2. Complete tests to determine composition of exhaust gas from diesel engine under various load and speed conditions [1]	2,400
3. Tests to determine the effectiveness of air intake or exhaust flame arrester in an intake or exhaust system	325
4. Check tests on redesigned components or equipment in item 3 above requiring less than 20 tests	165
5. Complete inspection of an intake or exhaust flame arrester	100
6. Complete inspection of manifolds, exhaust conditioners, and other components that comprise the intake and exhaust systems	150
7. Complete investigation of headlight, storage-battery type [2]	525
8. Complete investigation of headlight, dry-cell type [2]	280
9. Tests to determine the cooling efficiency of an exhaust conditioner and rate of water consumption	120
10. Surface temperature determinations and tests of safety controls	220
11. Each final inspection of completely assembled equipment	375
12. Tests of exhaust-gas dilution not made concurrently with final inspection of completely assembled equipment	115
13. Final examination and recording of drawings and specifications requisite to the issuance of a certificate of approval	175
14. Final examination and recording of drawings and specifications requisite to the issuance of a letter of certification	100
15. Examining and recording drawings and specifications requisite to the issuance of an extension of certification, each 4 hours or fraction thereof	35
16. Tests conducted in the field shall require the same fee as when conducted on MSHA's premises. In addition the applicant shall reimburse MSHA for such travel, subsistence, and incidental expenses as may be required by its representative(s) in accordance with the allowances stated in the "Standardized Government Travel Regulations."	

[1] Fee for partial tests shall be in proportion to the work done but the minimum shall be $500. If the applicant requests discontinuation of the investigation after preparations for engine tests have begun, the minimum fee shall be $500 regardless of the progress of the tests.

[2] Maximum normal fee; actual fee as detailed in Part 20 of Subchapter D of this Chapter (Schedule 10, revised, the latest revision of which is Schedule 10C).

(b) If an applicant is unable to determine the exact fee that should be submitted with his application, the information will be provided, upon request, addressed to Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059. The surplus from any fee submitted in excess of requirements will be refunded to the applicant upon completion or termination of the investigation.

[Sched. 31, 26 FR 645, Jan. 24, 1961, as amended at 30 FR 3757, Mar. 23, 1965; 43 FR 12318, Mar. 24, 1978]

§ 36.8 Date for conducting tests.

The date for acceptance of an application will determine the order of precedence for testing when more than one application is pending, and the applicant will be notified of the date on which tests will begin. If a complete assembly, or component, or subassembly fails to meet any of the requirements, it shall lose its order of precedence. However, if the cause of failure is corrected, testing will be resumed after completing such test work as may be in progress.

§ 36.9 Conduct of investigations, tests, and demonstrations.

(a) Prior to the issuance of a certificate of approval or a letter of certification, as the case may require, necessary Government personnel, representatives of the applicant, and such other persons as may be mutually agreed upon may observe the investigations or tests. MSHA shall hold as confidential and shall not disclose principles or patentable features prior to certification, nor shall it disclose any details of drawings, specifications, descriptions, or related materials. After the issuance of a certificate of approval, MSHA may conduct such public demonstrations and tests of the approved mobile diesel-powered transportation equipment for gassy noncoal mine and tunnels as it deems appropriate. The conduct of all investigations, tests, and demonstrations shall be under the direction and control of MSHA, and any other persons shall be present only as observers, except as noted in paragraph (b) of this section.

(b) When requested by MSHA, the applicant shall provide assistance in disassembling parts for inspection, preparing parts for testing, and operating equipment during the tests.

[Sched. 31, 26 FR 645, Jan. 24, 1961, as amended at 39 FR 24006, June 28, 1974]

§ 36.10 Certificate of approval.

(a) Upon completion of investigation of a complete assembly of mobile diesel-powered transportation equipment, MSHA will issue to the applicant either a certificate of approval or a written notice of disapproval, as the case may require. No informal notification of approval will be issued. If a certificate of approval is issued, no test data or detailed results of tests will accompany it. If a notice of disapproval is issued, it will be accompanied by details of the defects, with a view to possible correction. MSHA will not disclose, except to the applicant, any information on mobile diesel-powered transportation equipment upon which a notice of disapproval has been issued.

(b) A certificate of approval will be accompanied by a list of drawings, specifications, and related material covering the details of design and construction of equipment upon which the certificate of approval is based. Applicants shall keep exact duplicates of the drawings, specifications, and descriptions that relate to equipment which has received a certificate of approval, and these are to be adhered to exactly in production of the certified equipment.

(c) A certificate of approval will be accompanied by an appropriate caution statement specifying the conditions to be observed for operating and maintaining the equipment and to preserve its permissible status.

§ 36.11 Approval plates.

(a) A certificate of approval will be accompanied by a photograph of an approval plate, bearing the emblem of the Mine Safety and Health Administration and spaces for the approval number, the type, the serial number, and ventilation requirement; the name of the complete assembly; and the name of the applicant.

(b) The applicant shall reproduce the design as a separate plate, which shall be attached, in a suitable place, on each complete assembly to which it relates. The size, type, and method of attaching and location of an approval plate are subject to MSHA's approval. The method of affixing the approval plate shall not impair the permissibility (explosion-proof) features of the complete assembly of mobile diesel-powered transportation equipment.

(c) The approval plate identifies the equipment, to which it is attached, as permissible and is the applicant's guarantee that the equipment complies with the requirements of this part. Without an approval plate no equipment is considered permissible under the provisions of this part.

(d) Use of the approval plate obligates the applicant to whom the certificate of approval was granted to maintain in his plant the quality of each complete assembly bearing it and guarantees that it is manufactured and assembled according to the drawings, specifications, and descriptions upon which a certificate of approval was based.

[Sched. 31, 26 FR 645, Jan. 24, 1961, as amended at 43 FR 12318, Mar. 24, 1978]

§ 36.12 Changes after certification.

If an applicant desires to change any feature of certified equipment, he shall first obtain MSHA's approval of the change, pursuant to the following procedure:

(a) Application shall be made as for an original certificate of approval, requesting that the existing certification be extended to cover the proposed changes and shall be accompanied by drawings, specifications, and related data, showing the changes in detail.

(b) The application will be examined by MSHA to determine whether inspection and testing of the modified equipment or component or subassembly will be required. Testing will be necessary if there is a possibility that the modification may affect adversely the performance of the equipment. MSHA will inform the applicant whether such testing is required: the component, subassembly, and related material to be submitted for that purpose; and the fee.

(c) If the proposed modification meets the requirements of this part, a formal extension of certification will be issued, accompanied by a list of new and corrected drawings and specifications to be added to those already on file as the basis for the extension of certification.

§ 36.13 Withdrawal of certification.

MSHA reserves the right to rescind for cause any certificate of approval granted under this part.

Subpart B—Construction and Design Requirements

§ 36.20 Quality of material, workmanship, and design.

(a) MSHA will test only equipment that in the opinion of its qualified representatives is constructed of suitable materials, is of good quality workmanship, based on sound engineering principles, and is safe for its intended use. Since all possible designs, arrangements, or combinations of components and materials cannot be foreseen, MSHA reserves the right to modify the construction and design requirements of subassemblies or components and tests thereof to obtain the same degree of protection as provided by the tests described in Subpart C of this part.

(b) The quality of material, workmanship, and design shall conform to the applicable requirements of § 18.24 of Part 18 of Subchapter D of this chapter (Schedule 2, revised, the latest revision of which is Schedule 2F), titled "Detailed requirements for Class I parts."

§ 36.21 Engine for equipment considered for certification.

Only equipment powered by a compression-ignition (diesel) engine and burning diesel fuel (see § 36.2(i)) will be considered for approval and certification. The starting mechanism shall be actuated pneumatically, hydraulically, or by other methods acceptable to MSHA. Electric starting shall not be accepted. Engines burning other fuels or utilizing volatile fuel starting aids will not be investigated.

§ 36.22 Fuel-injection system.

This system shall be so constructed that the quantity of fuel injected can be controlled at a desired maximum value and shall be so arranged that this adjustment can be changed only after breaking a seal or unlocking a compartment. Provision shall be made for convenient adjustment of the maximum fuel-injection rate to that required for safe operation at different altitudes (elevations above sea level). The governor, controlling engine speed and fuel injection, shall not directly affect airflow to the engine and provision shall be made to seal or lock its adjustment compartment. Filters shall be provided to insure that only clean fuel will reach the injection pump or injectors.

§ 36.23 Engine intake system.

(a) *Construction.* The intake system (exclusive of the air cleaner) shall be designed to withstand an internal pressure equal to 4 times the maximum pressure observed in explosion tests, which are described in § 36.46, or a pressure of 125 pounds per square inch, whichever is the lesser. Joints in the intake system shall be formed by metal flanges fitted with metal or metal-clad gaskets, positively positioned by through bolts or other suitable means for secure assembly, or shall meet the requirements for flanged metal-to-metal flame-proof joints as required in § 36.20(b). Either type of joint shall withstand repeated explosions within the intake system without permanent deformation and shall prevent the propagation of flame through the joint into a surrounding flammable mixture.

(b) *Intake flame arrester.* (1) The intake system shall include a flame arrester that will prevent an explosion within the system from propagating to a surrounding flammable mixture. This flame arrester shall be between the air cleaner and the intake manifold and shall be attached so that it may be removed for inspecting, cleaning, or repairing. Its construction shall be such that it may be cleaned readily. The flame arrester shall be of rugged construction to withstand the effects of repeated explosions within the intake system, and the material of construction shall resist deterioration in service. It shall be so mounted in the equipment assembly that it is protected from accidental external damage.

(2) The parts of any flame arrester shall be positively positioned to produce a flame path that will arrest the propagation of an explosion and shall be so designed that improper assembly is impossible. In flame arresters of the spaced-plate type, the thickness of the plates shall be at least 0.125 inch; spacing between the plates shall not exceed 0.018 inch; and the plates forming the flame path shall be at least 1 inch wide. The unsupported length of the plates shall be short enough that deformation during the explosion tests shall not exceed 0.002 inch. Corrosion-resistant metal shall be used to construct flame arresters.

(c) *Air shutoff valve.* The intake system shall include a valve, operable from the operator's compartment, to shut off the air supply to the engine. This valve shall be constructed to permit its operation only after the fuel supply to the engine is shut off. In reverse operation the valve must open fully before fuel can be supplied to the engine.

(d) *Air cleaner.* An air cleaner shall be included in the engine intake system and so arranged that only clean air will enter the flame arrester. The resistance to airflow shall not increase rapidly in dusty atmospheres. Filters of the self-cleansing (oil-bath) type will be considered satisfactory for this application. Provision, satisfactory to MSHA, shall be made to prevent overfilling the oil-bath air cleaner.

(e) *Vacuum-gage connection.* A connection shall be provided in the intake system for temporary attachment of a vacuum gage to indicate the pressure drop under flow conditions. This opening shall be closed by a plug or other suitable device that is sealed or locked in place except when a gage is attached.

§ 36.24 Engine joints.

(a) *Cylinder head.* The joint between the cylinder head and block of the engine shall be fitted with a metal or metal-clad gasket satisfactory to MSHA held securely in position by through bolts or other suitable means to prevent a change in alignment. This joint shall provide an adequate flame barrier with the gasket in place.

(b) *Valve guides.* Valve guides shall be long enough to form an adequate flame barrier along the valve stem.

(c) *Gaskets.* All metal or metal-clad gaskets shall maintain their tightness during repeated explosions within the engine and its intake and exhaust systems to prevent the propagation of flame.

§ 36.25 Engine exhaust system.

(a) *Construction.* The exhaust system of the engine shall be designed to withstand an internal pressure equal to 4 times the maximum pressure observed in explosion tests, which are described in § 36.46, or a pressure of 125 pounds per square inch, whichever is the lesser. The system shall withstand repeated internal explosions without permanent deformation or deterioration.

(b) *Exhaust flame arrester.* (1) The exhaust system of the engine shall be provided with a flame arrester to prevent propagation of flame or discharge of heated particles to a surrounding flammable mixture. The flame arrester shall be so positioned that only cooled exhaust gas will discharge through it and shall be so designed and attached that it can be removed for inspecting, cleaning, or repairing. Its construction shall be such that it can be cleaned readily. The flame arrester shall be of rugged construction to withstand the effects of repeated explosions within the exhaust system, and the material of construction shall resist deterioration in service. It shall be so mounted in the equipment assembly that it is protected from accidental external damage.

(2) A spaced-plate flame arrester for the exhaust system shall meet the same requirements as flame arresters for the intake system (see § 36.23(b)(2)).

(3) In lieu of a space-place flame arrester, an exhaust-gas cooling box or conditioner may be used as the exhaust flame arrester provided that explosion tests demonstrate that the cooling box will arrest flame. When used as a flame arrester the cooling

box shall be equipped with a device to shut off automatically the fuel supply to the engine at a safe minimum water level. A cooling box used as a flame arrester shall withstand repeated explosion tests without permanent deformation. It shall be constructed of material, satisfactory to MSHA, that will resist deterioration in service.

(c) *Exhaust cooling system.* (1) A cooling system shall be provided for the engine exhaust gas. The heat-dissipation capacity shall be capable of reducing the temperature of the undiluted exhaust gas to less than 170° F. at the point of discharge from the cooling system under any condition of engine operation acceptable to MSHA. A device shall be provided that will automatically shut off the fuel supply to the engine immediately if the temperature of the exhaust gas exceeds 185° F. at the point of discharge from the cooling system. Provision shall be made, acceptable to MSHA, to prevent restarting the engine after the fuel supply has been shut off automatically until the water supply in the cooling box has been replenished. When the cooling box is used as a flame arrester, one safety device may be accepted provided it controls a safe minimum water level in the cooling box and also prevents the final exhaust temperature from exceeding 185° F.

(2) Cooling shall be obtained by passing the exhaust gas through water or a dilute aqueous chemical solution held in a cooling box or conditioner, or by a spray of water or a dilute aqueous chemical solution that will enter the exhaust system near the outlet of the exhaust manifold, or a combination of the two methods. When a spray is used it shall be provided with a filtering device to protect the nozzle from clogging. Provisions shall be made for draining and cleaning all parts of the exhaust cooling system. Openings for draining and cleaning shall be closed and sealed or locked by a method satisfactory to MSHA.

(3) The cooling system shall be constructed of corrosion-resistant metal suitable for the intended application.

(4) The cooling system shall store enough water or aqueous solution to permit operation of the engine at one-third load factor for eight hours. The minimum quantity of usable water or aqueous solution available for cooling shall equal the consumption for one hour with the engine operating at maximum load and speed multiplied by 8 and this product divided by 3.

(d) *Surface temperature of engine and exhaust system.* (1) The temperature of any external surface of the engine or exhaust system shall not exceed 400° F. under any condition of engine operation prescribed by MSHA. Water-jacketed components shall have integral jackets and provision shall be made for positive circulation of water in the jackets and to automatically shut off the engine when the temperature in the cooling jacket(s) exceeds 212° F. Insulated coverings to control surface temperature are not acceptable.

(2) When a spray is used to reduce the temperature of the exhaust gas, it shall be located as near as practicable to the outlet of the exhaust manifold.

(3) Exterior surfaces of the exhaust system shall be designed to minimize accumulation and lodgement of dust or combustible substances and to permit ready access for cleaning.

(e) *Tightness of exhaust system.* All joints in the exhaust system shall be tight to prevent the flow of exhaust gas through them under any condition of engine operation prescribed by MSHA. A tight system shall be obtained by the use of ground joints, or thin metal or metal-clad gaskets. All such joints shall be fitted with adequate through bolts and all gaskets shall be aligned and held firmly in position by the bolts or other suitable means. Such joints shall remain tight to prevent passage of flame or propagation of repeated internal explosions to a surrounding flammable mixture.

(f) *Dilution of exhaust gas.* (1) Provision shall be made to dilute the exhaust gas with and before it is discharged into the surrounding atmosphere. The discharged exhaust gas shall be so diluted with air that the mixture shall not contain more than 0.5 percent, by volume, of carbon dioxide; 0.01 percent, by volume, of carbon monoxide; 0.0025 percent, by volume, of oxides of nitrogen (calculated as equivalent nitrogen dioxide); or 0.0010 percent, by volume, of aldehydes (calculated as equivalent formaldehyde) under any condition of engine operation prescribed by MSHA.

(2) The final diluted exhaust mixture shall be discharged in such a manner that it is directed away from the operator's compartment and also away from the breathing zones of persons required to be alongside the equipment.

(g) *Pressure-gage connection.* A connection shall be provided in the exhaust system for convenient, temporary attachment of a pressure gage at a point suitable for measuring the total back pressure in the system. The connection also shall be suitable for temporary attachment of gas-sampling equipment to the exhaust system. This opening shall be closed by a plug or other suitable device that is sealed or locked in place except when a gage or sampling tube is attached.

§ 36.26 Composition of exhaust gas.

(a) *Preliminary engine adjustment.* The engine shall be submitted to MSHA by the applicant in such condition that it can be tested immediately at full load and speed. The preliminary liquid-fuel-injection rate shall be such that the exhaust will not contain black smoke and the applicant shall adjust the injection rate promptly to correct any adverse conditions disclosed by preliminary tests.

(b) *Final engine adjustment.* The liquid fuel supply to the engine shall be adjusted so that the undiluted exhaust gas shall contain not more than 0.30 percent, by volume, of carbon monoxide or 0.20 percent, by volume, of oxides of nitrogen (calculated as equivalent nitrogen dioxide, NO_2) under any conditions of engine operation prescribed by MSHA when the intake air mixture to the engine contains 1.5±0.1 percent, by volume, of Pittsburgh natural gas.[3]

(c) *Coupling or adapter.* The applicant shall provide the coupling or adapter for connecting the engine to MSHA's dynamometer.

NOTE: Preferably this coupling or adapter should be attached to the flywheel of the engine.

Clutches, transmissions, or torque converters ordinarily are not required in the coupling train.

§ 36.27 Fuel-supply system.

(a) *Fuel tank.* (1) The fuel tank shall not leak and shall be fabricated of metal at least 1/16 inch thick, welded at all seams, except that tanks of 5 gallons or less capacity may have thinner walls which shall be preformed or reinforced to provide good resistance to deflection. A drain plug (not a valve or petcock) shall be provided and locked in position. A vent opening shall be provided in the fuel filler cap of such design that atmospheric pressure is maintained inside the tank. The size of the vent opening shall be restricted to prevent fuel from splashing through it. The filler opening shall be so arranged that fuel can be added only through a self-closing valve at least 1 foot from the exhaust manifold of the engine, preferably below it. The self-closing valve shall constitute a fuel-tight closure when fuel is not being added. Any part of the self-closing valve that might become detached during the addition of fuel shall be secured to the tank by a chain or other fastening to prevent loss.

(2) The fuel tank shall have a definite position in the equipment assembly, and no provision shall be made for attachment of separate or auxiliary fuel tanks.

(3) Capacity of the fuel tank shall not exceed the amount of fuel necessary to operate the engine continuously at full load for approximately four hours.

(b) *Fuel lines.* All fuel lines shall be installed to protect them against damage in ordinary use and they shall be designed, fabricated, and secured to resist breakage from vibration.

(c) *Valve in fuel line.* A shutoff valve shall be provided in the fuel system, installed in a manner acceptable to MSHA.

NOTE: This shutoff valve is in addition to the normal shutoff provided in the fuel-injection system and also in addition to the air-shutoff valve.

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[3] Investigation has shown that for practical purposes, Pittsburgh natural gas (containing a high percentage of methane) is a satisfactory substitute for pure methane in these tests.

§ 36.28 Signal or warning device.

All mobile diesel-powered transportation equipment shall be provided with a bell, horn, or other suitable warning device convenient to the operator. Warning devices shall be operated manually or pneumatically.

§ 36.29 Brakes.

All mobile diesel-powered transportation equipment shall be equipped with adequate brakes acceptable to MSHA.

§ 36.30 Rerailing device.

All mobile diesel-powered transportation equipment designed to travel on rails in haulage service shall carry a suitable rerailing device.

§ 36.31 Fire extinguisher.

Each unit of mobile diesel-powered transportation equipment shall be fitted with a fire extinguisher carried in a location easily accessible to the operator and protected by position from external damage. Liquid carbon dioxide extinguishers shall contain an active charge of not less than 4 pounds. Pressurized dry chemical extinguishers shall contain an active charge of not less than 2½ pounds.

§ 36.32 Electrical components and systems.

(a) Electrical components on mobile diesel-powered transportation equipment shall be certified or approved under Part 18, 20 or 27 of this chapter, as applicable, and shall bear the certification number assigned by MSHA.

(b) Electrical systems on mobile diesel-powered transportation equipment shall meet the requirements of Part 18 or 27 of this chapter, as applicable.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811))

[47 FR 11372, Mar. 16, 1982]

§ 36.33 Headlights and fixtures.

(a) Headlights and lighting fixtures on mobile diesel-powered transportation equipment shall be protected from external damage by recessing them in the equipment frame, enclosing them within a shield of substantial construction, or by any other method that provides equivalent protection.

(b) Mobile diesel-powered transportation equipment shall be equipped with at least one headlight on each end.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811))

[47 FR 11372, Mar. 16, 1982]

Subpart C—Test Requirements

§ 36.40 Test site.

Tests shall be conducted at MSHA's Diesel Testing Laboratory or other appropriate place(s) determined by MSHA.

[39 FR 24006, June 28, 1974, as amended at 43 FR 12318, Mar. 24, 1978]

§ 36.41 Testing methods.

Mobile diesel-powered transportation equipment submitted for certification and approval shall be tested to determine its combustion, explosion-proof, and other safety characteristics. MSHA shall prescribe the tests and reserves the right to modify the procedure(s) to attain these objectives (see § 36.20).

§ 36.42 Inspection.

A detailed inspection shall be made of the equipment and all components and features related to safety in operation. The inspection shall include:

(a) Investigating the materials, workmanship, and design to determine their adequacy.

(b) Checking the parts and assemblies against the drawings and specifications with respect to materials, dimensions, and locations to verify their conformance.

(c) Inspecting and measuring joints, flanges, and other possible flame paths in the intake and exhaust systems to determine whether they will prevent the issuance of flame or propagation of an internal explosion.

(d) Inspecting and measuring flame arresters to determine whether they will prevent the issuance of flame or propagation of an internal explosion.

§ 36.43 Determination of exhaust-gas composition.

(a) Samples shall be taken to determine the composition of the exhaust gas while the engine is operated at loads and speeds prescribed by MSHA to determine the volume of air (ventilation) required to dilute the exhaust gas (see § 36.45). The engine shall be at temperature equilibrium before exhaust-gas samples are collected or other test data are observed. At all test conditions the intake mixture shall contain 1.5±0.1 percent, by volume, of Pittsburgh natural gas (see footnote 3) in the air. Test observations shall include the rate of fuel consumption, pressures, temperatures, and other data significant in the safe operation of diesel equipment in underground gassy noncoal mines and tunnels.

(b) Exhaust-gas samples shall be analyzed for carbon dioxide, oxygen, carbon monoxide, hydrogen, methane, nitrogen, oxides of nitrogen, and aldehydes, or any other constituent prescribed by MSHA.

(c) The intake and exhaust systems shall be complete with all component equipment such as air cleaners, flame arresters, and exhaust cooling systems. The performance of component equipment shall be observed to determine whether it functions properly.

§ 36.44 Maximum allowable fuel : air ratio.

(a) When an engine is delivered to MSHA with the fuel-injection system adjusted by the applicant and tests of the exhaust-gas composition (see § 36.43) show not more than 0.30 percent, by volume, of carbon monoxide, the applicant's adjustment of the fuel-injection system shall be accepted. The maximum fuel : air ratio determined from the exhaust-gas composition shall be designated as the maximum allowable fuel : air ratio. The maximum liquid fuel rate (pounds per hour) that produces the maximum allowable fuel : air ratio shall be designated as the maximum allowable fuel rate for operating the equipment at elevations not exceeding 1,000 feet above sea level.

(b) When the carbon monoxide content of the exhaust exceeds 0.30 percent, by volume, only near maximum power output, the maximum fuel : air ratio at which carbon monoxide does not exceed 0.30 percent shall be calculated and designated as the maximum allowable fuel : air ratio. The corresponding calculated liquid fuel rate shall be designated as the maximum allowable fuel rate at elevations not exceeding 1,000 feet above sea level.

NOTE: The applicant may be requested to adjust the liquid fuel rate during tests to determine the maximum allowable fuel : air ratio.

(c) The maximum allowable fuel : air ratio and maximum liquid fuel rates shall be used to calculate a liquid fuel rate-altitude table that shall govern the liquid fuel rate of engines operated at elevations exceeding 1,000 feet above sea level.

§ 36.45 Quantity of ventilating air.

(a) Results of the engine tests shall be used to calculate ventilation (cubic feet of air per minute) that shall be supplied by positive air movement when the permissible mobile diesel-powered transportation equipment is used underground. This quantity shall be stamped on the approval plate. The quantity so determined shall apply when only one machine is operated.

(b) Determination of the ventilation rate shall be based upon dilution of the exhaust gas with normal air. The most undesirable and hazardous condition of engine operation prescribed by MSHA shall be used in the calculations. The concentration of any of the following individual constituents in the diluted mixture shall not exceed:

0.25 percent, by volume, of carbon dioxide (CO_2).

0.005 percent, by volume, of carbon monoxide (CO).

0.00125 percent, by volume, of oxides of nitrogen (calculated as equivalent nitrogen dioxide, NO_2).

The oxygen (O_2) content of the diluted mixture shall be not less than 20 percent, by volume. The maximum quantity of normal air to produce the above dilution shall be designated the ventilation rate.

NOTE: This ventilation rate will provide a factor of safety for exposure of persons to air mixtures containing harmful or objectionable gases and for minor variations in engine performance.

§ 36.46 Explosion tests of intake and exhaust systems.

(a) Explosion tests to determine the strength of the intake and exhaust systems to withstand internal explosions and the adequacy of the flame arresters to prevent the propagation of an explosion shall be made with the systems connected to the engine or the systems simulated as connected to the engine. The system shall be filled with and surrounded by an explosive natural gas-air mixture. The mixture within the intake and exhaust systems shall be ignited by suitable means and the internal pressure developed by the resultant explosion shall be determined. Tests shall be conducted with the ignition source in several different locations to determine the maximum pressure developed by an internal explosion.

(b) Explosion tests shall be made with the engine at rest and with the flammable natural gas-air mixtures in the intake and exhaust systems. In other tests with the flammable mixture in motion, the engine shall be driven (externally) at speeds prescribed by MSHA but no liquid fuel shall be supplied to the injection valves.

(c) The temperature of the flame arresters in the intake or exhaust systems shall not exceed 212° F. when an explosion test is conducted. Any water-spray cooling for the exhaust system shall not be operated and water shall not be present in the exhaust cooling boxes except when water is the cooling agent for a cooling box designed to act as a flame arrester, in which case MSHA will prescribe the test conditions.

(d) The explosion tests of the intake and exhaust systems shall not result in:

(1) Discharge of visible flame from any joint or opening.

(2) Ignition of surrounding flammable gas-air mixture.

(3) Development of dangerous afterburning.[4]

(4) Excessive pressures.

§ 36.47 Tests of exhaust-gas cooling system.

(a) The adequacy of the exhaust-gas cooling system and its components shall be determined with the engine operating at the maximum allowable liquid fuel rate and governed speed with 0.5±0.1 percent, by volume, of natural gas in the intake air mixture. All parts of the engine and exhaust-gas cooling system shall be at their respective equilibrium temperatures. The cooling spray, if any, shall be operated, and all compartments designed to hold cooling water shall be filled with the quantity of water recommended by the applicant. No cooling air shall be circulated over the engine or components in the cooling system during the test.

(b) Determinations shall be made during the test to establish the cooling performance of the system, the cooling water consumption, high-water level when the system sprays excess water, and low-water level when the cooling system fails.

(c) The final exhaust-gas temperature at discharge from the cooling system, and before the exhaust gas is diluted with air, shall not exceed 170° F. or the temperature of adiabatic saturation, if this temperature is lower.

(d) Water consumed in cooling the exhaust gas under the test conditions shall not exceed by more than 15 percent that required for adiabatic saturation of the exhaust-gas at the final temperature. Water in excess of that required for adiabatic saturation shall be considered as entrained water. Enough water shall be available in the cooling system or in reserve supply compartments for sustained satisfactory operation for at least 2⅔ hours under the test conditions.

NOTE: This amount is enough to cool the exhaust for an 8-hour shift at one-third load factor.

(e) The adequacy of the automatic fuel shutoff actuated by the temperature of the final exhaust shall be determined with the engine operating under test conditions by withdrawing water until the cooling system fails to function. The final exhaust-gas temperature at which the liquid fuel to the engine is automatically shut off shall be noted. This temperaure shall not exceed 185° F.

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[4] The term "afterburning" as used in this part is applied to combustion of a flammable gas-air mixture drawn into the system under test by the cooling of the products from an explosion in the system.

(f) Following the automatic fuel shutoff test in paragraph (e) of this section, the temperature of the control point shall be allowed to fall to 170° F. At this temperature and with the water replenished in the cooling system, it shall be possible to start the engine.

NOTE: If the cooling system includes a reserve supply water tank, the line or lines connecting it to the cooling compartment may require a suitable flame arrester.

(g) The effectiveness of the automatic engine shut-off, which will operate when the water in the cooling jacket(s) exceeds 212° F., shall be determined by causing the jacket temperature to exceed 212° F.

§ 36.48 Tests of surface temperature of engine and components of the cooling system.

(a) The surface temperatures of the engine, exhaust cooling system, and other components subject to heating by engine operation shall be determined with the engine operated as prescribed by MSHA. All parts of the engine, cooling system, and other components shall have reached their respective equilibrium temperatures. The exhaust cooling system shall be operated, but air shall not be circulated over the engine or components. Surface temperatures shall be measured at various places prescribed by MSHA to determine where maximum temperatures develop.

(b) The temperature of any surface shall not exceed 400° F.

NOTE: The engine may be operated under test conditions prescribed by MSHA while completely surrounded by a flammable mixture. MSHA reserves the right to apply combustible materials, likely to be found in gassy noncoal mines or tunnels, to any surface for test. Operation under such conditions shall not ignite the flammable mixture.

§ 36.49 Tests of exhaust-gas dilution system.

The performance and adequacy of the exhaust-gas dilution system shall be determined in tests of the complete equipment. The engine, at temperature equilibrium, shall be operated in normal air as prescribed by MSHA. Samples of the undiluted exhaust gas and of the diluted exhaust gas, at location(s) prescribed by MSHA, shall be considered with the data obtained from the engine test (see § 36.43) to determine that the concentrations of carbon dioxide, carbon monoxide, oxides of nitrogen, and aldehydes in the diluted exhaust shall be below the required concentrations specified in § 36.25(f)(1).

§ 36.50 Tests of fuel tank.

The fuel tank shall be inspected and tested to determine whether: (a) It is fuel-tight, (b) the vent maintains atmospheric pressure within the tank, and (c) the vent and closure restrict the outflow of liquid fuel.

SUBCHAPTER F—[RESERVED]

SUBCHAPTER G—FILING AND OTHER ADMINISTRATIVE REQUIREMENTS

PART 40—REPRESENTATIVE OF MINERS

Sec.

40.1 Definitions.
40.2 Requirements.
40.3 Filing procedures.
40.4 Posting at mine.
40.5 Termination of designation as representative of miners.

AUTHORITY: Secs. 5(f)(1), 101(c) and (e), 103(c), (f), (g)(1) and (g)(2), 104(c), 105(a), (b)(1), (c)(1), (c)(2), (c)(3), and (d), 107(b)(1) and (e)(1), 109(b), 115(a)(1) and (a)(2), 302(a), 305(b), 312(b), 505 and 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 83 Stat. 745, 91 Stat. 1294, 1295, 1298, 1299, 1301, 1303, 1304, 1305, 1308, 1310 and 1316, 83 Stat. 766, 777, 785, 802, and 803 (30 U.S.C. 804(f)(1), 811(c) and (e), 813(c), (f), (g)(1) and (g)(2), 814(c), 815(a), (b)(1), (c)(1), (c)(2), (c)(3) and (d), 817(b)(1) and (e)(1), 819(b), 825(a)(1) and (a)(2), 862(a), 865(b), 872(b), 954 and 957); Sec. 307 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1322 (30 U.S.C. 801 note).

SOURCE: 43 FR 29509, July 7, 1978, unless otherwise noted.

§ 40.1 Definitions.

As used in this Part 40:

(a) "Act" means the Federal Mine Safety and Health Act of 1977.

(b) "Representative of miners" means:

(1) Any person or organization which represents two or more miners at a coal or other mine for the purposes of the Act, and

(2) "Representatives authorized by the miners", "miners or their representative", "authorized miner representative", and other similar terms as they appear in the Act.

§ 40.2 Requirements.

(a) A representative of miners shall file with the Mine Safety and Health Administration District Manager for the district in which the mine is located the information required by § 40.3 of this part. Concurrently, a copy of this information shall be provided to the operator of the mine by the representative of miners.

(b) Miners or their representative organization may appoint or designate different persons to represent them under various sections of the act relating to representatives of miners.

(c) All information filed pursuant to this part shall be maintained by the appropriate Mine Safety and Health Administration District Office and shall be made available for public inspection.

OMB CONTROL No. 1219-0042. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[43 FR 29509, July 7, 1978, as amended at 47 FR 14696, Apr. 6, 1982]

§ 40.3 Filing procedures.

(a) The following information shall be filed by a representative of miners with the appropriate District Manager, with copies to the operators of the affected mines. This information shall be kept current:

(1) The name, address, and telephone number of the representative of miners. If the representative is an organization, the name, address, and telephone number of the organization and the title of the official or position, who is to serve as the representative and his or her telephone number.

(2) The name and address of the operator of the mine where the represented miners work and the name, address, and Mine Safety and Health Administration identification number, if known, of the mine.

(3) A copy of the document evidencing the designation of the representative of miners.

(4) A statement that the person or position named as the representative

of miners is the representative for all purposes of the Act; or if the representative's authority is limited, a statement of the limitation.

(5) The names, addresses, and telephone numbers, of any representative to serve in his absence.

(6) A statement that copies of all information filed pursuant to this section have been delivered to the operator of the affected mine, prior to or concurrently with the filing of this statement.

(7) A statement certifying that all information filed is true and correct followed by the signature of the representative of miners.

(b) The representative of miners shall be responsible for ensuring that the appropriate District Manager and operator have received all of the information required by this part and informing such District Manager and operator of any subsequent changes in the information.

§ 40.4 Posting at mine.

A copy of the information provided the operator pursuant to § 40.3 of this part shall be posted upon receipt by the operator on the mine bulletin board and maintained in a current status.

§ 40.5 Termination of designation as representative of miners.

(a) A representative of miners who becomes unable to comply with the requirements of this part shall file a statement with the appropriate District Manager terminating his or her designation.

(b) The Mine Safety and Health Administration shall terminate and remove from its files all designations of representatives of miners which have been terminated pursuant to paragraph (a) of this section or which are not in compliance with the requirements of this part. The Mine Safety and Health Administration shall notify the operator of such termination.

PART 41—NOTIFICATION OF LEGAL IDENTITY

Subpart A—Definitions

Sec.
41.1 Definitions.

Subpart B—Notification of Legal Identity

41.10 Scope.
41.11 Notification by operator.
41.12 Changes; notification by operator.
41.13 Failure to notify.

Subpart C—Operator's Report to the Mine Safety and Health Administration

41.20 Legal identity report.
41.30 Address of record and telephone number.

AUTHORITY: Secs. 103(h), 109(d) and 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1299 and 1310, 83 Stat. 803 (30 U.S.C. 813(h), 819(d) and 957); Sec. 307 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1322 (30 U.S.C. 801 note).

SOURCE: 43 FR 29512, July 7, 1978, unless otherwise noted.

Subpart A—Definitions

§ 41.1 Definitions.

As used in this part:

(a) "Operator" means any owner, lessee, or other person who operates, controls, or supervises a coal or other mine or any designated independent contractor performing services or construction at such mine.

(b) "Person" means any individual, sole proprietor, partnership, association, corporation, firm, subsidiary of a corporation, or other organization.

(c) "Coal or other mine" means (a) an area of land from which minerals are extracted in nonliquid form or, if in liquid form, are extracted with workers underground, (b) private ways and roads appurtenant to such area, and (c) lands, excavations, underground passageways, shafts, slopes, tunnels and workings, structures, facilities, equipment, machines, tools, or other property including impoundments, retention dams, and tailings ponds, on the surface or underground, used in, or to be used in, or resulting from, the work of extracting such minerals from their natural deposits in nonliquid form, or if in liquid form, with workers underground, or used in, or to be used in, the milling of such minerals, or the work of preparing coal or other minerals, and includes custom coal preparation facilities. In making a determination of what constitutes mineral milling for purposes of this act, the Secretary shall give due consideration to the convenience of administration resulting from the delegation to one Assistant Secretary of all authority with respect to the health and safety of miners employed at one physical establishment.

Subpart B—Notification of Legal Identity

§ 41.10 Scope.

Section 109(d) of the Federal Mine Safety and Health Act of 1977 (Pub. L. 91-173, as amended by Pub. L. 95-164), requires each operator of a coal or other mine to file with the Secretary of Labor the name and address of such mine, the name and address of the person who controls or operates the mine, and any revisions in such names and addresses. Section 103(h) of the act requires the operator of a coal or other mine to provide such information as the Secretary of Labor may reasonably require from time to time to enable the Secretary to perform his functions under the act. The regulations in this Subpart B provide for the notification to the Mine Safety and Health Administration of the legal identity of the operator of a coal or other mine and the reporting of all changes in the legal identity of the operator as they occur. The submission of a properly completed Legal Identity Report Form No. 2000-7 required under Subpart C of this part will constitute adequate notification of legal identity to the Mine Safety and Health Administration.

§ 41.11 Notification by operator.

(a) Not later than 30 days after (1) the effective date of this part, and (2) the opening of a new mine thereafter, the operator of a coal or other mine shall, in writing, notify the appropriate district manager of the Mine Safety and Health Administration in the district in which the mine is located of the legal identity of the operator in accordance with the applicable provisions of paragraphs (b), (c), (d), or (e) of this section.

(b) If the operator is a sole proprietorship, the operator shall state: (1) His full name and address; (2) the name and address of the mine and the Federal mine identification number; (3) the name and address of the person at the mine in charge of health and safety; (4) the name and address of the person with overall responsibility for a health and safety program at all of the operator's mines, if the operator is not directly involved in the daily operation of the mine; (5) the Federal mine identification numbers of all other mines in which the sole proprietor has a 20 percent or greater ownership interest; and (6) the trade name, if any, and the full name, address of record and telephone number of the proprietorship.

(c) If the operator is a partnership, the operator shall state: (1) The name and address of the mine and the Federal mine identification number; (2) the name and address of the person at the mine in charge of health and safety; (3) the name and address of the person with overall responsibility for a health and safety program at all of the operator's mines, if the operator is not directly involved in the daily operation of the mine; (4) the Federal mine identification numbers of all other mines in which the partnership has a 20 percent or greater ownership interest; (5) the full name and address of all partners; (6) the trade name, if any, and the full name and address of record and telephone number of the partnership; and (7) the Federal mine identification numbers of all other mines in which any partner has a 20 percent or greater ownership interest.

(d) If the operator is a corporation, the operator shall state: (1) The name and address of the mine and the Federal mine identification number; (2) the name and address of the person at the mine in charge of health and safety; (3) the name and address of the person with overall responsibility for a health and safety program at all of the operator's mines, if the operator is not directly involved in the daily operation of the mine; (4) the Federal mine identification numbers of all other mines in which the corporation has a 20 percent or greater ownership interest; (5) the full name, address of record and telephone number of the corporation and the State of incorporation; (6) the full name and address of each officer and director of the corporation; (7) whether such corporation is a domestic or foreign corporation in the State in which the mine is located; (8) if the corporation is a subsidiary corporation, the operator shall state the full name, address, and State of incorporation of the parent corporation; and (9) the Federal mine identification numbers of all other mines in which any corporate officer has a 20 percent or greater ownership interest.

(e) If the operator is any organization other than a sole proprietorship, partnership, or corporation, the operator shall state: (1) The nature and type, or legal identity of the organization; (2) the name and address of the mine and the Federal mine identification number; (3) the name and address of the person at the mine in charge of health and safety; (4) the name and address of the person with overall responsibility for a health and safety program at all of the operator's mines, if the operator is not directly involved in the daily operation of the mine; (5) the Federal mine identification numbers of all other mines in which the organization has a 20 percent or greater ownership interest; (6) the full name, address of record and telephone number of the organization; (7) the name and address of each individual who has an ownership interest in the organization; (8) the name and address of the principal organization officials or members; and (9) the Federal mine identification numbers of all other mines in which any official or member has a 20 percent or greater ownership interest.

§ 41.12 Changes; notification by operator.

Within 30 days after the occurrence of any change in the information required by § 41.11, the operator of a coal or other mine shall, in writing, notify the appropriate district manager of the Mine Safety and Health Administration in the district in which the mine is located of such change.

§ 41.13 Failure to notify.

Failure of the operator to notify the Mine Safety and Health Administration, in writing, of the legal identity of the operator or any changes thereof within the time required under this part will be considered to be a violation of section 109(d) of the Act and shall be subject to penalties as provided in section 110 of the Act.

Subpart C—Operator's Report to the Mine Safety and Health Administration

§ 41.20 Legal identity report.

Each operator of a coal or other mine shall file notification of legal identity and every change thereof with the appropriate district manager of the Mine Safety and Health Administration by properly completing, mailing, or otherwise delivering form 2000-7 "legal identity report" which shall be provided by the Mine Safety and Health Administration for this purpose. If additional space is required, the operator may use a separate sheet or sheets.

§ 41.30 Address of record and telephone number.

The address of record and telephone number required under this part shall be considered the operator's official address and telephone number for purposes of the Act. Service of documents upon the operator may be proved by a post office return receipt showing that the documents could not be delivered to such operator at the address of record because the operator had moved without leaving a forwarding address or because delivery was not accepted at that address, or because no such address existed. However, operators may request service by delivery to another appropriate address provided by the operator. The telephone number required under this part will be used in connection with proposed civil penalty assessments as provided in 30 CFR Part 100.

PART 43—PROCEDURES FOR PROCESSING HAZARDOUS CONDITIONS COMPLAINTS

Subpart A—General

Sec.
43.1 Definitions.
43.2 General.
43.3 Purpose and scope of this part.

Subpart B—Special Inspections

43.4 Requirements for giving notice.
43.5 Action by the Secretary.
43.6 Notice of negative finding.

Subpart C—Informal Review

43.7 Informal review upon written notice given to an inspector on the mine premises.
43.8 Informal review upon the issuance of a notice of negative finding.

AUTHORITY: Secs. 103(g), and 508 of the Federal Mine Safety and Health Act of 1977 Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1298 83 Stat. 803 (30 U.S.C. 813(g) and 957); Sec. 307 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1322 (30 U.S.C. 801 note).

SOURCE: 43 FR 29515, July 7, 1978, unless otherwise noted.

Subpart A—General

§ 43.1 Definitions.

For purposes of this part, "Act" means the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173, as amended by Pub. L. 95-164, and "Secretary" means the Secretary of Labor or his designee.

§ 43.2 General.

(a) Under section 103(g)(1) of the Act, a representative of miners, or where there is no such representative, a miner, who has reasonable grounds to believe that a violation of the act or a mandatory health or safety standard exists, or an imminent danger exists, has a right to obtain a special inspection if he or she gives notice of such violation to the Secretary or his duly authorized representative. The notice shall be reduced to writing and signed by the miners' representative or miner, and a copy that does not reveal the name of the person giving the notice must be served on the operator no later than at the time of the inspection. If the Secretary determines that a violation or danger does not exist, he must so notify the miners' representative or miner in writing.

(b) Under section 103(g)(2) of the Act, a representative of miners or, if there is no such representative, a miner, may notify in writing an authorized representative of the Secretary who is on mine premises prior to or during an inspection, of any violation or imminent danger which he or she has reason to believe exists in the mine. There shall be procedures for the informal review of any refusal by the Secretary's authorized representative to issue a citation with respect to such alleged violation or danger, including notification to the miners' representative or miner of the reasons for his disposition of the case.

OMB CONTROL No. 1219-0014. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[43 FR 29515, July 7, 1978, as amended at 47 FR 14696, Apr. 6, 1982]

§ 43.3 Purpose and scope of this part.

This part sets forth the procedures for giving notice to the Secretary under section 103(g)(1) of the Act, for responding to such notices and for reviewing refusals by authorized representatives of the Secretary to issue citations or orders under section 103 (g)(1) or (g)(2). Specifically, Subpart B details the steps to be taken by a representative of miners or a miner in making a request for a special inspection and by the Secretary in processing and taking action on such a request under section 103(g)(1). Subpart C sets forth informal review procedures which a representative of miners or a miner may request under sections 103 (g)(1) and (g)(2) where no citation or order is issued under those sections.

Subpart B—Special Inspections

§ 43.4 Requirements for giving notice.

(a) A representative of miners or, where there is no such representative, a miner, who has reasonable grounds to believe that a violation of the act or a mandatory health or safety standard exists, or that an imminent danger exists, may obtain a special inspection by giving notice to the Secretary or any authorized representative of the Secretary of such violation or danger.

(b) Any such notice shall set forth the alleged violation or imminent danger and the location of such violation or danger and shall be reduced to a writing signed by the representative of miners or miner giving such notice.

(c) A copy of such written notice shall be provided to the operator or his agent by the Secretary or his authorized representative no later than the time that the inspection begins. In addition, if the notice indicates that an imminent danger exists, the operator or his agent shall be notified as quickly as possible of the alleged danger. The name of the person giving such notice and the names of any individual miners referred to therein shall not appear in the copy of the written notice or in a notification provided to the operator.

§ 43.5 Action by the Secretary.

(a) As soon as possible after the receipt of a notice of alleged violation or imminent danger under this subpart, the Secretary or his authorized representative shall make a special inspection to determine if a citation or withdrawal order should be issued, unless on the face of the notice, the condition complained of, even if it were found to exist, would clearly not constitute a violation or imminent danger.

(b) Where the Secretary or his authorized representative makes a special inspection under this subpart and finds a violation or imminent danger, a citation or withdrawal order, as appropriate, shall be issued.

§ 43.6 Notice of negative finding.

(a) If it is determined that a special inspection is not warranted, a written notice of negative finding shall be issued as soon as possible following such determination.

(b) If it is determined that an inspection is warranted and upon such inspection it is determined that neither a citation nor a withdrawal order should be issued for the alleged violation or imminent danger, a written notice of negative finding shall be issued by the authorized representative of the Secretary prior to leaving the mine premises.

(c) Any notice of negative finding issued under this part shall be issued to the representative of miners or miner seeking the special inspection and a copy shall be served upon the operator.

Subpart C—Informal Review

§ 43.7 Informal review upon written notice given to an inspector on the mine premises.

(a) A representative of miners or, where there is no such representative, a miner, who has reason to believe that a violation of the Act or a mandatory health or safety standard exists, or an imminent danger exists, may notify an authorized representative of the Secretary in writing prior to or during an inspection conducted by such representative of any violation of the Act or mandatory health or safety standard or of any imminent danger which he or she has reason to believe exists in the mine being inspected. Where the authorized representative or the Secretary refuses to issue a citation or order with respect to such alleged violation or imminent danger, the representative of miners or miner may obtain review of such refusal in accordance with paragraphs (b) through (d) of this section.

(b) A request for informal review shall be sent in writing to the appropriate district manager within 10 days of the date of the refusal to issue a citation or order and shall be accompanied by any supporting information the person requesting review wishes to submit.

(c) After receipt of the request for informal review, the district manager or his agent may hold, at his or her discretion, an informal conference where the person requesting review can present his views.

(d) After review of all written and oral statements submitted, the district manager may either affirm the refusal to issue a citation or order or may direct that a new inspection be conducted with respect to the alleged violation or imminent danger. The district manager shall furnish the person requesting review with a written statement of the reasons for his or her final disposition of the request as soon thereafter as possible. A copy of such statement shall be furnished the operator. The district manager's determination in the matter shall be final.

§ 43.8 Informal review upon issuance of a notice of negative finding.

A person to whom a notice of negative finding has been issued pursuant to § 43.6 of this part may request informal review of such finding in accordance with the provisions of § 43.7(b)-(d) of this subpart.

PART 44—RULES OF PRACTICE FOR PETITIONS FOR MODIFICATION OF MANDATORY SAFETY STANDARDS

Subpart A—General

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44.3 Parties.
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44.5 Notice of a granted petition for modification.
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44.10 Filing of petition; service.
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Subpart D—Summary Decisions

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Subpart E—Effect of Initial Decision

44.50 Effect of appeal on decision; application for relief pending appeal.
44.51 Finality for purposes of judicial review.
44.52 Revocation of modification.

AUTHORITY: Secs. 101 and 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291, 83 Stat. 803 (30 U.S.C. 811 and 957); Sec. 301(c)(3) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1318 (30 U.S.C. 961(c)(3)).

SOURCE: 43 FR 29518, July 7, 1978, unless otherwise noted.

Subpart A—General

§ 44.1 Scope and construction.

(a) The procedures and rules of practice set forth in this part shall govern petitions for modification of the application of mandatory safety standards filed under section 101(c) of the Act and, to the extent applicable, pending petitions for modification initially filed with the Office of Hearings and Appeals of the Department of the Interior.

(b) These rules shall be liberally construed to carry out the purpose of the Act by assuring adequate protection of miners and to secure just and prompt determination of all proceedings consistent with adequate consideration of the issues involved.

§ 44.2 Definitions.

As used in this part, unless the context clearly requires otherwise, the term—

(a) "Act" means the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173, as amended by Pub. L. 95-164.

(b) "Secretary," "operator," "agent," "person," "miner," and "coal or other mine," have the meanings set forth in section 3 of the act.

(c) "Assistant Secretary" means the Assistant Secretary of Labor for Mine Safety and Health.

(d) "Administrative law judge" means an administrative law judge of the Department of Labor appointed under section 3105 of title 5 of the United States Code.

(e) "Representative of miners" means a person or organization designated by two or more miners to act as their representative for purposes of the act and who is in compliance with 30 CFR Part 40.

(f) "Pending petitions for modification" means proceedings initially filed with the Department of the Interior under section 301(c) of the Federal Coal Mine Health and Safety Act of 1969 prior to March 9, 1978, and in which there had not been a final departmental decision as of March 9, 1978.

§ 44.3 Parties.

Parties to proceedings under this part shall include the Mine Safety and Health Administration, the operator of the mine, and any representative of the miners in the affected mine. Any other person claiming a right of participation as an interested party in a proceeding may become a party upon application to the Assistant Secretary and the granting of such application. After referral of a petition to the Chief Administrative Law Judge, all applications for status as a party shall be made to the Chief Administrative Law Judge for his disposition.

§ 44.4 Standard of evaluation of petitions; effect of petitions granted.

(a) A petition for modification of application of a mandatory safety standard may be granted upon a determination that—

(1) An alternative method of achieving the result of the standard exists that will at all times guarantee no less than the same measure of protection afforded by the standard, or

(2) Application of the standard will result in a diminution of safety to the miners.

(b) Except as may be provided in § 44.50 of this part for relief pending appeal, a decision by an Administrator or an administrative law judge granting or denying a petition for modification shall not be effective until time for appeal has expired under § 44.14 or § 44.33 of this part, as appropriate.

(c) All petitions for modification granted pursuant to this part shall have only future effect: *Provided*, That the granting of the modification under this part shall be considered as a factor in the resolution of any enforcement action previously initiated for claimed violation of the subsequently modified mandatory safety standard. Orders granting petitions for modification may contain special terms and conditions to assure adequate protection to miners. The modification, together with any conditions, shall have the same effect as a mandatory safety standard.

§ 44.5 Notice of a granted petition for modification.

(a) Every final action granting a petition for modification under this part shall be published in the FEDERAL REGISTER. Every such final action published shall specify the statutory grounds upon which the modification is based and a summary of the facts which warranted the modification.

(b) Every final action or a summary thereof granting a petition for modification under this part shall be posted by the operator on the mine bulletin board at the affected mine and shall remain posted as long as the modification is effective. If a summary of the final action is posted on the mine bulletin board, a copy of the full decision shall be kept at the affected mine office and made available to the miners.

§ 44.6 Service.

(a) Copies of all documents filed in any proceeding described in this part and copies of all notices pertinent to such proceeding shall be served by the filing party on all other persons made parties to the proceeding under § 44.3.

If a request for hearing has been filed by any party, a copy of all subsequent documents filed shall be served upon the Mine Safety and Health Administration through its representative, the Office of the Solicitor, Department of Labor.

(b) Provisions for service of requests for expedited proceedings are stated in §§ 44.16(i) and 44.50(b) (10) of this part. All other documents filed subsequent to a petition for modification may be served personally or by first-class mail to the last known address of the party.

(c) Whenever a party is represented by an attorney who has signed any document filed on behalf of such party or otherwise entered an appearance on behalf of such party, service thereafter shall be made upon the attorney.

(d) Any party filing a petition for modification under these rules shall file proof of service in the form of a return receipt where service is by registered or certified mail or an acknowledgment by the party served or a verified return where service is made personally. A certificate of service shall accompany all other documents filed by a party under these rules.

(e) Except as otherwise provided in § 44.10 of this part for petitions for modification and in §§ 44.16(i) and 44.50(b) (10) of this part for expedited proceedings, service by mail shall be complete upon mailing.

(f) Whenever a party has the right or is required to do some act within a prescribed period after the service of a document or other material upon him and the document or other material is served upon him by mail, three days shall be added to the prescribed period: *Provided*, That specific provision may, for good cause, be made otherwise by an order of an administrative law judge or the Assistant Secretary in a particular proceeding pending before that person.

§ 44.7 Transfer of pending petitions for modification.

(a) On March 9, 1978, all petitions pending before the Office of Hearings and Appeals of the Department of the Interior are transferred to the Department of Labor as provided herein. All transferred cases shall be subject to the regulations of this part, as applicable.

(b) Where an investigation report and amended answer have been filed, the case is transferred to the docket of the Chief Administrative Law Judge, Department of Labor, for further proceedings.

(c) Where an investigation report has not been filed, the case is transferred to the appropriate Administrator, Mine Safety and Health Administration, for a proposed decision and order pursuant to these regulations.

§ 44.8 Ex parte communication.

There shall be no ex parte communication with respect to the merits of any case not concluded between the administrative law judge, including any employee or agent of the administrative law judge, and any of the parties, intervenors, representatives, or other interested persons.

§ 44.9 Posting of petition.

An operator of a mine for which there is no representative of miners shall post a copy of each petition concerning the mine on the mine bulletin board and shall maintain the posting until a ruling on the petition becomes final.

Subpart B—Initial Procedure for Petitions for Modification

§ 44.10 Filing of petition; service.

A petition under section 101(c) of the Act for modification of the application of a mandatory safety standard may be filed only by the operator of the affected mine or any representative of the miners at such mine. All petitions must be in writing and must be filed with the Assistant Secretary of Labor for Mine Safety and Health, U.S. Department of Labor, 4015 Wilson Boulevard, Arlington, Va. 22203. If the petition is filed by a mine operator, a copy of the petition shall be served by the mine operator upon a representative of miners at the affected mine. If the petition is filed by a representative of the miners, a copy of the petition shall be served by the representative of miners upon the mine operator. Service shall be accomplished personally or by registered or certified mail, return receipt requested.

OMB Control No. 1219-0065. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[43 FR 29518, July 7, 1978, as amended at 47 FR 14696, Apr. 6, 1982]

§ 44.11 Contents of petition.

(a) A petition for modification filed pursuant to §44.10 shall contain:

(1) The name and address of the petitioner.

(2) The mailing address and mine identification number of the mine or mines affected.

(3) The mandatory safety standard to which the petition is directed.

(4) A concise statement of the modification requested, and whether the petitioner proposes to establish an alternate method in lieu of the mandatory safety standard or alleges that application of the standard will result in diminution of safety to the miners affected or requests relief based on both grounds.

(5) A detailed statement of the facts the petitioner would show to establish the grounds upon which it is claimed a modification is warranted.

(6) Identification of any representative of the miners at the affected mine, if the petitioner is a mine operator.

(b) A petition for modification shall not include a request for modification of the application of more than one mandatory safety standard. A petition for modification shall not request relief for more than one operator. However, an operator may file a petition for modification pertaining to more than one mine where it can be shown that identical issues of law and fact exist as to the petition for each mine.

§ 44.12 Procedure for public notice of petition received.

(a) Promptly upon receipt of a petition for modification, the Mine Safety and Health Administration will give notice of the petition to each known representative of miners or the operator of the affected mine, as appropriate, and shall publish notice of the petition in the Federal Register.

(b) The Federal Register notice shall contain a statement that the petition has been filed, identify the petitioner and the mine or mines to which the petition relates, cite the mandatory safety standard for which modification is sought, describe the requested relief, and summarize the facts claimed by petitioner to warrant the requested modification.

(c) All such notices shall advise interested parties that they may, within 30 days from the date of publication in the Federal Register, in writing, comment upon or provide information relative to the proposed modification.

§ 44.13 Proposed decision.

Upon receipt of a petition for modification, the Mine Safety and Health Administration shall cause an investigation to be made as to the merits of the petition. As soon thereafter as is practicable, the appropriate Administrator shall make a proposed decision and order based upon all available information, including the results of the investigation. The proposed decision and order shall be served on all parties to the proceeding. The proposed decision shall become final upon the 30th day after service thereof, unless a request for hearing has been filed with the appropriate Administrator, as provided in § 44.14 of this part. Service of the proposed decision is complete upon mailing.

OMB Control No. 1219-0065. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[43 FR 29518, July 7, 1978, as amended at 47 FR 14696, Apr. 6, 1982]

§ 44.14 Request for hearing

A request for hearing filed in accordance with § 44.13 of this part must be filed within 30 days after service of the proposed decision and shall include:

(a) A concise summary of position on the issues of fact or law desired to be raised by the party requesting the hearing, including specific objections to the proposed decision. A party other than petitioner who has requested a hearing shall also comment upon all issues of fact or law presented in the petition, and

(b) An indication of a desired hearing site.

§ 44.15 Referral to Chief Administrative Law Judge.

Upon receipt of a request for hearing as provided in § 44.14 of this part or upon his own initiative, the appropriate Administrator shall refer to the Chief Administrative Law Judge the original petition, the proposed decision and order, all information upon which the proposed decision was based, any written request for a hearing on the petition filed, and any other written comments or information received and considered in making the proposed decision.

§ 44.16 Application for interim relief.

(a) *Time for filing.* An application for interim relief from enforcement of a mandatory safety standard may be filed at any time before a final departmental decision on the petition for modification to which the application relates.

(b) *With whom filed.* If a hearing is pending on the petition for modification, the application shall be filed with and decided by the administrative law judge assigned or the Chief Administrative Law Judge if assignment has not been made. If the petition is pending before an Administrator or the Assistant Secretary, the application shall be filed with and decided by the Administrator or Assistant Secretary, as appropriate.

(c) *Appeal to administrative law judge.* If the application for interim relief is denied by an Administrator, the applicant may request, within 15 days of the denial, a hearing on the application. The request shall be addressed to the Administrator and shall be referred by him to the Chief Administrative Law Judge for hearing and decision by an administrative law judge.

(d) *Contents of application.* An application for interim relief shall comply with applicable general requirements of this part, state the specific relief requested, and state how the applicant meets the criteria set forth in paragraph (e) of this section.

(e) *Criteria.* Before interim relief is granted, the applicant must clearly show that (1) the petition seeking modification has been filed in good faith, and the applicant is not using the proceeding solely to postpone or avoid abatement; (2) the requested relief will not adversely affect the health or safety of miners in the affected mine; and (3) there is a substantial likelihood that the decision on the merits of the petition for modification will be favorable to the applicant.

(f) *Response.* All parties to the proceeding in which the application is filed shall have 3 days from date of receipt of the application to file a written response.

(g) *Evidence.* An application for temporary relief or response thereto may be supported by affidavits or other evidentiary matter.

(h) *Hearing.* The Administrator, Assistant Secretary, or administrative law judge may order that a hearing be held on any of the issues raised in the application.

(i) *Expedited proceedings.* A party may request that the decision on interim relief be expedited. The request shall be in writing, addressed to the person designated in paragraph (b) of this section, and accompanied by supporting documents that establish the party's claim of exigent circumstances warranting expedited proceedings. Service of such requests, where possible, shall be by personal delivery to all parties; otherwise, service shall be by telegram followed by registered or certified mail. Parties shall have 3 days from receipt of the request to file a response. The official considering the request may order that a hearing be held on any of the issues raised in the request. The official may order expedited proceedings, including expedited schedules for pleadings, prehearing conference, and hearing, as he considers appropriate: *Provided,* That a hearing on the application for interim relief shall not be scheduled with less than 5 days notice to the parties, unless all parties to the proceeding consent to an earlier hearing.

OMB Control No. 1219-0065. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511. 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[43 FR 29518, July 7, 1978, as amended at 43 FR 35687, Aug. 11, 1978; 47 FR 14696, Apr. 6, 1982]

Subpart C—Hearings

§ 44.20 Designation of administrative law judge.

Upon receipt of a request for hearing in a petition for modification proceeding, the Chief Administrative Law Judge shall designate an administrative law judge appointed under section 3105 of title 5 of the United States Code to preside over the hearing.

§ 44.21 Filing and form of documents.

(a) *Where to file.* After a petition has been referred to the Office of the Chief Administrative Law Judge, the parties will be notified of the name and address of the administrative law judge assigned to the case. All further documents shall be filed with the administrative law judge at the address designated or with the Chief Administrative Law Judge, if the assignment has not been made. While the petition is before the Assistant Secretary at any stage of the proceeding, all documents should be filed with the Assistant Secretary of Labor for Mine Safety and Health, 4015 Wilson Boulevard, Arlington, Va. 22203.

(b) *Caption, title and signature.* (1) The documents filed in any proceeding under this part shall be captioned in the name of the operator of the mine to which the proceeding relates and in the name of the mine or mines affected. After a docket number has been assigned to the proceeding by the Office of the Chief Administrative Law Judge, the caption shall contain such docket number.

(2) After the caption each such document shall contain a title which shall be descriptive of the document and which shall identify the party by whom the document is submitted.

(3) The original of all documents filed shall be signed at the end by the party submitting the document or, if the party is represented by an attorney, by such attorney. The address of the party or the attorney shall appear beneath the signature.

§ 44.22 Administrative law judges; powers and duties.

(a) *Powers.* An administrative law judge designated to preside over a hearing shall have all powers necessary or appropriate to conduct a fair, full, and impartial hearing, including the following:

(1) To administer oaths and affirmations;

(2) To issue subpoenas on his own motion or upon written application of a party;

(3) To rule upon offers of proof and receive relevant evidence;

(4) To take depositions or have depositions taken when the ends of justice would be served;

(5) To provide for discovery and determine its scope;

(6) To regulate the course of the hearing and the conduct of parties and their counsel;

(7) To consider and rule upon procedural requests;

(8) To hold conferences for settlement or simplification of issues by consent of the parties;

(9) To make decisions in accordance with the Act, this part, and section 557 of title 5 of the United States Code; and

(10) To take any other appropriate action authorized by this part, section 556 of title 5 of the United States Code, or the Act.

(b) *Disqualification.* (1) When an administrative law judge deems himself disqualified to preside over a particular hearing, he shall withdraw therefrom by notice on the record directed to the Chief Administrative Law Judge.

(2) Any party who deems an administrative law judge for any reason to be disqualified to preside or continue to preside over a particular hearing, may file with the Chief Administrative Law Judge of the Department of Labor a motion to be supported by affidavits setting forth the alleged grounds for disqualification. The Chief Administrative Law Judge shall rule upon the motion.

(c) *Contumacious conduct; failure or refusal to appear or obey rulings of a presiding administrative law judge.* (1) Contumacious conduct at any hearing before the administrative law judge shall be grounds for exclusion from the hearing.

(2) If a witness or party refuses to answer a question after being directed to do so or refuses to obey an order to provide or permit discovery, the administrative law judge may make such orders with regard to the refusal as are just and appropriate, including an order denying the application of a petitioner or regulating the contents of the record of the hearing.

(d) *Referral to Federal Rules of Civil Procedure and Evidence.* On any procedural question not regulated by this part, the act, or the Administrative Procedure Act, an administrative law judge shall be guided to the extent practicable by any pertinent provisions of the Federal Rules of Civil Procedure or Federal Rules of Evidence, as appropriate.

§ 44.23 Prehearing conferences.

(a) *Convening a conference.* Upon his own motion or the motion of a party, the administrative law judge may direct the parties or their counsel to meet with him for a conference to consider:

(1) Simplification of issues;

(2) Necessity or desirability of amendments to documents for clarification, simplification, or limitation;

(3) Stipulations and admissions of facts;

(4) Limitation of the number of parties and expert witnesses; and

(5) Such other matters as may tend to expedite the disposition of the proceeding and assure a just conclusion thereof.

(b) *Record of conference.* The administrative law judge may, where appropriate, issue an order which recites the action taken at the conference, amendments allowed to any filed documents, and agreements made between the parties as to any of the matters considered. The order shall limit the issues for hearing to those not disposed of by admissions or agreements. Such an order controls the subsequent course of the hearing, unless modified at the hearing to prevent manifest injustice.

§ 44.24 Discovery.

Parties shall be governed in their conduct of discovery by appropriate provisions of the Federal Rules of Civil Procedure, except as provided in § 44.25 of this part.

§ 44.25 Depositions.

(a) *Purpose.* For reasons of unavailability or for purpose of discovery, the testimony of any witness may be taken by deposition.

(b) *Form.* Depositions may be taken before any person having the power to administer oaths. Each witness testifying upon deposition shall be sworn, and the parties not calling him shall have the right to cross-examine him. Questions propounded and answers thereto, together with all objections made, shall be reduced to writing, read to or by the witness, subscribed by him, and certified by the officer before whom the deposition is taken. The officer shall send copies by registered mail to the Chief Administrative Law Judge or the presiding administrative law judge.

§ 44.26 Subpoenas; witness fees.

(a) Except as provided in paragraph (b) of this section, the Chief Administrative Law Judge or the presiding administrative law judge, as appropriate, shall issue subpoenas upon written application of a party requiring attendance of witnesses and production of relevant papers, books, documents, or tangible things in their possession and under their control. A subpoena may be served by any person who is not a party and is not less than 18 years of age, and the original subpoena bearing a certificate of service shall be filed with the administrative law judge. A witness may be required to attend a deposition or hearing at a place not more than 100 miles from the place of service.

(b) If a party's written application for subpoena is submitted 3 working days or less before the hearing to which it relates, a subpoena shall issue at the discretion of the Chief Administrative Law Judge or presiding administrative law judge, as appropriate.

(c) Any person served with a subpoena may move in writing to revoke or modify the subpoena. All motions to revoke or modify shall be served on the party at whose request the subpoena was issued. The administrative law judge shall revoke or modify the subpoena if in his opinion the evidence required to be produced does not relate to any matter under investigation or in question in the proceedings; the subpoena does not describe with sufficient particularity the evidence required to be produced; or if for any other reason, sufficent in law, the subpoena is found to be invalid or unreasonable. The administrative law judge shall make a simple statement of procedural or other grounds for the ruling on the motion to revoke or modify. The motion to revoke or modify, any answer filed thereto, and any ruling thereon shall become a part of the record.

(d) Witnesses subpoened by any party shall be paid the same fees for attendance and mileage as are paid in the District Courts of the United States. The fees shall be paid by the party at whose instance the witness appears.

§ 44.27 Consent findings and rules or orders.

(a) *General.* At any time before reception of evidence in any hearing or during any hearing, a reasonable opportunity may be afforded to permit negotiation by the parties of an agreement containing consent findings and a rule or order disposing of the whole or any part of the proceedings. Allowance of such opportunity and the duration thereof shall be in the discretion of the Chief Administrative Law Judge, if no administrative law judge has been assigned, or of the presiding administrative law judge. In deciding whether to afford such an opportunity, the administrative law judge shall consider the nature of the proceeding, requirements of the public interest, representations of the parties, and probability of an agreement which will result in a just disposition of the issues involved.

(b) *Contents.* Any agreement containing consent findings and rule or order disposing of a proceeding shall also provide:

(1) That the rule or order shall have the same effect as if made after a full hearing;

(2) That the record on which any rule or order may be based shall consist solely of the petition and agreement;

(3) A waiver of further procedural steps before the administrative law judge and Assistant Secretary; and

(4) A waiver of any right to challenge or contest the validity of the findings and rule or order made in accordance with the agreement.

(c) *Submission.* On or before expiration of the time granted for negotiations, the parties or their counsel may:

(1) Submit the proposed agreement to the Chief Administrative Law Judge or presiding administrative law judge, as appropriate, for his consideration; or

(2) Inform the Chief Administrative Law Judge or presiding administrative law judge, as appropriate, that agreement cannot be reached.

(d) *Disposition.* In the event an agreement containing consent findings and rule or order is submitted within the time allowed, the Chief Administrative Law Judge or presiding administrative law judge, as appropriate, may accept the agreement by issuing his decision based upon the agreed findings.

§ 44.28 Notice of hearing.

(a) The administrative law judge shall fix a place and date for the hearing and notify all parties at least 30 days in advance of the date set, unless at least one party requests and all parties consent to an earlier date, or the hearing date has been otherwise advanced in accordance with this part. The notice shall include:

(1) The time, place, and nature of the hearing; and

(2) The legal authority under which the hearing is to be held.

(b) In accordance with the provisions of section 554 of title 5 of the United States Code, a party may move for transfer of a hearing on the basis of convenience to parties and witnesses. Such motion should be filed with the administrative law judge assigned to the case.

§ 44.29 Motions.

Each motion filed shall be in writing and shall contain a short and plain statement of the grounds upon which it is based. A statement in opposition to the motion may be filed by any party within 10 days after the date of service. The administrative law judge may permit oral motions during proceedings.

§ 44.30 Hearing procedures.

(a) *Order of proceeding.* Except as may be ordered otherwise by the administrative law judge, the petitioner shall proceed first at a hearing.

(b) *Burden of proof.* The petitioner shall have the burden of proving his case by a preponderance of the evidence.

(c) *Evidence.* (1) *Admissibility.* A party shall be entitled to present its case or defense by oral or documentary evidence, to submit rebuttal evidence, and to conduct such cross-examination as may be required for full and true disclosure of the facts. Any oral or documentary evidence may be received, but the administrative law judge shall exclude evidence which is irrelevant, immaterial, or unduly repetitious.

(2) *Testimony of witnesses.* The testimony of a witness shall be upon oath or affirmation administered by the administrative law judge.

(3) *Objections.* If a party objects to admission or rejection of any evidence, limitation of the scope of any examination or cross-examination, or failure to limit such scope, he shall state briefly the grounds for such objection. Rulings on such objections shall appear in the record.

(4) *Exceptions.* Formal exception to an adverse ruling is not required.

(d) *Official notice.* Official notice may be taken of any material fact not appearing in evidence in the record, which is among the traditional matters of judicial notice or concerning which the Department of Labor by reason of its functions is presumed to be expert: *Provided,* That the parties shall be given adequate notice at the hearing or by reference in the presiding administrative law judge's decision of the matters so noticed and shall be given adequate opportunity to show the contrary.

(e) *Transcript.* Copies of the transcript of the hearing may be obtained by the parties upon written application filed with the reporter and payment of fees at the rate provided in the agreement with the reporter.

§ 44.31 Proposed findings of fact, conclusions, and orders.

After consultation with the parties, the administrative law judge may prescribe a time not less than 20 days within which each party may file proposed findings of fact, conclusions of law, and rule or order, together with a supporting brief expressing the reasons for such proposals. Such proposals and brief shall be served on all other parties and shall refer to all portions of the record and to all authorities relied upon in support of each proposal.

§ 44.32 Initial decision.

(a) As soon as practicable after the time allowed for the filing of proposed findings of fact and conclusions of law, the administrative law judge shall make and serve upon each party his decision, which shall become final upon the 30th day after service thereof, unless an appeal is filed as provided in § 44.33 of this part. The decision of the administrative law judge shall include:

(1) A statement of numbered findings of fact and conclusions of law, with reasons therefor, upon each material issue of fact, law, or discretion presented on the record, and

(2) The appropriate rule, order, relief, or denial thereof.

(b) The decision of the administrative law judge shall be based upon a consideration of the whole record and shall state all facts officially noticed and relied upon. It shall be made on the basis of a preponderance of reliable and probative evidence.

§ 44.33 Departmental review.

(a) *Notice of appeal.* Any party may appeal from the initial decision of the administrative law judge by filing with the Assistant Secretary a notice of appeal within 30 days after service of the initial decision. The Assistant Secretary may consolidate related appeals. Copies of a notice of appeal shall be served on all parties to the proceeding in accordance with § 44.6 of this part.

(b) *Statement of objections.* Within 20 days after filing the notice of appeal, the appellant shall file his statement of objections to the decision of the administrative law judge and serve copies on all other parties to the proceeding. The statement shall refer to the specific findings of fact, conclusions of law, or terms of the order objected to in the initial decision. Where any objection is based upon evidence of record, the objection need not be considered by the Assistant Secretary if specific record citations to the pertinent evidence are not contained in the statement of objections.

(c) *Responding statements.* Within 20 days after service of the statement of objections, any other party to the proceeding may file a statement in response.

(d) *Existing appeals of pending petitions.* The entire record of each pending petition or appeal within the Department of the Interior shall be transferred to the Assistant Secretary for decision in accordance with the provisions of § 44.35 of this part.

§ 44.34 Transmission of record.

If an appeal is filed, the administrative law judge shall transmit the record of the proceeding to the Assistant Secretary for review. The record shall include: the application; any request for hearing thereon; motions and requests filed in written form; rulings thereon; the transcript of testimony taken at the hearing, together with exhibits admitted in evidence; any documents or papers filed in connection with prehearing conferences; such proposed findings of fact, conclusions of law, rules or orders, and supporting reasons, as may have been filed; and the administrative law judge's decision.

§ 44.35 Decision of the Assistant Secretary.

Appeals from a decision rendered pursuant to § 44.32 of this part or appeals pursuant to § 44.33(d) of this part shall be decided by the Assistant Secretary based upon consideration of the entire record of the proceedings transmitted, together with the statements submitted by the parties. The decision may affirm, modify, or set aside, in whole or part, the findings, conclusions, and rule or order contained in the decision of the presiding administrative law judge and shall include a statement of reasons for the action taken.

Subpart D—Summary Decisions

§ 44.40 Motion for summary decision.

(a) Any party may, at least 20 days before the date fixed for any hearing under Subpart C of this part, move with or without supporting affidavits for a summary decision on all or any part of the proceeding. Any other party may, within 10 days after service of the motion, serve opposing affidavits or countermove for summary decision. The administrative law judge may set the matter for argument and call for submission of briefs.

(b) Filing of any documents under paragraph (a) of this section shall be with the administrative law judge, and copies of such documents shall be served in accordance with § 44.6 of this part.

(c) Any affidavits submitted with the motion shall set forth such facts as would be admissible in evidence in a proceeding subject to 5 U.S.C. 556 and 557 and shall show affirmatively that the affiant is competent to testify to the matters stated therein. When a motion for summary decision is made and supported as provided in this section, a party opposing the motion may not rest upon the mere allegations or denials of such pleading. Such response must set forth specific facts showing that there is a genuine issue of fact for the hearing.

(d) The administrative law judge may grant the motion if the pleadings, affidavits, material obtained by discovery or otherwise, or matters officially noticed show that there is no genuine issue as to any material fact and a party is entitled to summary decision. The administrative law judge may deny the motion whenever the moving party denies access to information by means of discovery to a party opposing the motion.

(e) The denial of all or part of a motion for summary decision by the administrative law judge shall not be subject to interlocutory appeal to the Assistant Secretary unless the administrative law judge certifies in writing that (1) the ruling involves an important question of law or policy as to which there are substantial grounds for difference of opinion, and (2) an immediate appeal from the ruling may materially advance termination of the proceeding. The allowance of an interlocutory appeal shall not stay the proceedings before the administrative law judge unless ordered by the Assistant Secretary.

§ 44.41 Summary decision.

(a) *No genuine issue of material fact.* (1) Where no genuine issue of a material fact is found to have been raised, the administrative law judge may issue an initial decision to become final 30 days after service thereof, unless, within such time, any party has filed an appeal with the Assistant Secretary. Thereafter, the Assistant Secretary, after consideration of the entire record, may issue a final decision.

(2) An initial decision and a final decision made under this paragraph shall include a statement of—

(i) Findings and conclusions, and the reasons therefor, on all issues presented; and

(ii) Any terms and conditions of the rule or order.

(3) A copy of an initial decision and final decision under this paragraph shall be served on each party.

(b) *Hearings on issues of fact.* Where a genuine question of material fact is raised, the administrative law judge shall, and in any other case may, set the case for an evidentiary hearing in accordance with Subpart C of this part.

Subpart E—Effect of Initial Decision

§ 44.50 Effect of appeal on decision; application for relief pending appeal.

(a) Except as may result from procedures set forth in paragraph (b) of this section, a proposed decision of an Administrator is not operative pending appeal to an administrative law judge, and a decision of an administrative law judge is not operative pending appeal to the Assistant Secretary.

(b) *Application for relief pending appeal.* (1) *Purpose.* The purpose of an application for relief pending appeal is to give effect to a decision of an Administrator or administrative law judge until the decision is affirmed or reversed on appeal.

(2) *Time for filing.* An application for relief pending appeal shall be filed within 10 days of the decision sought to be effectuated.

(3) *With whom filed.* If an Administrator's decision is the subject of the application, it shall be filed with and decided by the administrative law judge assigned or the Chief Administrative Law Judge if assignment has not been made. If an administrative law judge's decision is the subject of the application, it shall be filed with the Assistant Secretary and shall be decided by him.

(4) *Appeal.* A decision on the application for relief pending appeal is not subject to appeal, unless the administrative law judge or Assistant Secretary certifies in writing that (1) the ruling involves an important question of law or policy as to which there are substantial grounds for difference of opinion, and (2) an immediate appeal from the ruling may materially advance termination of the proceeding. The allowance of an interlocutory appeal shall not stay the proceeding unless ordered by the Assistant Secretary.

(5) *Contents of application.* An application for relief pending appeal shall comply with applicable general requirements of this part, state the specific relief requested, and state how the applicant meets the criteria set forth in paragraph (b)(6) of this section.

(6) *Criteria.* Before relief is granted, the applicant must clearly show that (1) the requested relief will not adversely affect the health or safety of miners in the affected mine, and (2) there is a substantial likelihood that the decision on appeal will be favorable to the applicant.

(7) *Response.* All parties to the proceeding in which the application is filed shall have 3 days from date of receipt of the application to file a written response.

(8) *Evidence.* An application for relief pending appeal or response thereto shall ordinarily be decided solely by reference to the record as it exists at the time the application and response thereto are timely filed.

(9) *Hearing.* The Assistant Secretary or administrative law judge may order that a hearing be held on any of the issues raised in the application.

(10) *Expedited proceedings.* A party may request that the decision on relief pending appeal be expedited. The request shall be in writing, addressed to the person designated in paragraph (b)(3) of this section, and accompanied by supporting documents that establish the party's claim of exigent circumstances warranting expedited proceedings. Service of such requests, where possible, shall be by personal delivery to all parties; otherwise, service shall be by telegram followed by registered or certified mail. Parties shall have 3 days from receipt of the request to file a response. The official considering the request may order that a hearing be held on any of the issues raised in the request. The official may order expedited proceedings, including expedited schedules for pleadings, prehearing conference, and hearing, as he considers appropriate: *Provided,* That a hearing on the application for relief pending appeal shall not be scheduled with less than 5 days notice to the parties, unless all parties to the proceeding consent to an earlier hearing.

[43 FR 29509, July 7, 1978; 43 FR 35687, Aug. 11, 1978]

§ 44.51 Finality for purposes of judicial review.

Only a decision by the Assistant Secretary shall be deemed final agency action for purposes of judicial review. A decision by an Administrator or administrative law judge which becomes final for lack of appeal is not deemed final agency action for purposes of 5 U.S.C. 704.

§ 44.52 Revocation of modification.

Any party to a proceeding under this part in which a petition for modification of a mandatory safety standard was granted may petition that the relief granted be revoked due to a change in circumstances, because findings which justified the relief are no longer valid. Such petition to revoke shall be filed with the Chief Administrative Law Judge for his disposition and shall be subject to all procedures of subparts C-E as if it were a petition filed under § 44.10 of this part.

PART 45—INDEPENDENT CONTRACTORS

Sec.

45.1 Scope and purpose.
45.2 Definitions.
45.3 Identification of independent contractors.
45.4 Independent contractor register.
45.5 Service of documents; independent contractors.
45.6 Address of record and telephone number; independent contractors.

AUTHORITY: Secs. 3(d) and 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1290, 83 Stat. 803 (30 U.S.C. 802(d) and 957), Pub. L. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.).

SOURCE: 45 FR 44496, July 1, 1980, unless otherwise noted.

OMB CONTROL No. 1219-0043. (47 FR 14706, Apr. 6, 1982)

§ 45.1 Scope and purpose.

This part sets forth information requirements and procedures for independent contractors to obtain an MSHA identification number and procedures for service of documents upon independent contractors. Production-operators are required to maintain certain information for each independent contractor at the mine. The purpose of this rule is to facilitate implementation of MSHA's enforcement policy of holding independent contractors responsible for violations committed by them and their employees.

§ 45.2 Definitions.

As used in this part:

(a) "Act" means the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173, as amended by Pub. L. 95-164;

(b) "District Manager" means the District Manager of the Mine Safety and Health Administration District in which the independent contractor is located;

(c) "Independent contractor" means any person, partnership, corporation, subsidiary of a corporation, firm, association or other organization that contracts to perform services or construction at a mine; and,

(d) "Production-operator" means any owner, lessee, or other person who operates, controls or supervises a coal or other mine.

§ 45.3 Identification of independent contractors.

(a) Any independent contractor may obtain a permanent MSHA identification number. To obtain an identification number, an independent contractor shall submit to the District Manager in writing the following information:

(1) The trade name and business address of the independent contractor;

(2) An address of record for service of documents;

(3) A telephone number at which the independent contractor can be contacted during regular business hours; and

(4) The estimated annual hours worked on mine property by the independent contractor in the previous calendar year, or in the instance of a business operating less than one full calendar year, prorated to an annual basis.

OMB CONTROL No. 1219-0040. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[45 FR 44496, July 1, 1980, as amended at 47 FR 14696, Apr. 6, 1982]

§ 45.4 Independent contractor register.

(a) Each independent contractor shall provide the production-operator in writing the following information:

(1) The independent contractor's trade name, business address and business telephone number;

(2) A description of the nature of the work to be performed by the independent contractor and where at the mine the work is to be performed;

(3) The independent contractor's MSHA identification number, if any; and

(4) The independent contractor's address of record for service of citations, or other documents involving the independent contractor.

(b) Each production-operator shall maintain in writing at the mine the information required by paragraph (a) of this section for each independent contractor at the mine. The production-operator shall make this information available to any authorized representative of the Secretary upon request.

§ 45.5 Service of documents; independent contractors.

Service of citations, orders and other documents upon independent contractors shall be completed upon delivery to the independent contractor or mailing to the independent contractor's address of record.

§ 45.6 Address of record and telephone number; independent contractors.

(a) The address and telephone number required under this part shall be the independent contractor's official address and telephone number for purposes of the Act. Service of documents upon independent contractors may be proved by a Post Office return receipt showing that the documents were delivered to the address of record or that the documents could not be delivered to the address of record because the independent contractor is no longer at that address and has established no forwarding address; because delivery was not accepted at that address; or because no such address exists. Independent contractors may request service by delivery to another appropriate address of record provided by the independent contractor. The telephone number required under this part will be used in connection with the proposed penalty assessment procedures in 30 CFR Part 100.

PART 46—STATE GRANTS FOR ADVANCEMENT OF HEALTH AND SAFETY IN COAL AND OTHER MINES

Subpart A—General

Sec.
46.1 Purpose and scope.
46.2 Definitions.
46.3 Purpose of making and States eligible to receive grants.

Subpart B—Application for Grants

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Subpart E—Reports

46.16 State monitoring of grant-supported activities; reports.
46.17 Acknowledgement of Federal Government participation.

Subpart F—Consultation and Cooperation

46.18 Consultation and cooperation.

AUTHORITY: Secs. 503 and 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 83 Stat. 800, 803 (30 U.S.C. 953, 957).

SOURCE: 44 FR 28588, May 15, 1979, unless otherwise noted.

Subpart A—General

§ 46.1 Purpose and scope.

This part provides the procedures for making grants to States under the provisions of section 503 of the Federal Mine Safety and Health Act of 1977 (Pub. L. 91-173 as amended by Pub. L. 95-164). Additional standards contained in Office of Management and Budget Circular A-102 (Revised) "UNIFORM ADMINISTRATIVE REQUIREMENTS FOR GRANTS-IN-AID TO STATE AND LOCAL GOVERNMENTS" dated August 24, 1977, (42 FR 45828-45891) are also applicable to grant instruments entered into between the Federal and State Governments.[1]

§ 46.2 Definitions.

As used in this part and in grants entered into pursuant to this part:

(a) "Government" means the United States of America.

(b) "Secretary" means the Secretary of Labor or his authorized representative.

(c) "MSHA" means the Mine Safety and Health Administration of the U.S. Department of Labor.

(d) "Assistant Secretary" means the Assistant Secretary of Labor for Mine Safety and Health, U.S. Department of Labor or his authorized representative.

(e) "State" means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, Guam, and the Trust Territory of the Pacific Islands in which coal or other mining takes place.

(f) "Fiscal Year" means a 12-month period ending on September 30.

(g) "Act" means the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164.

§ 46.3 Purpose of making and States eligible to receive grants.

(a) The Secretary, in coordination with the Secretary of Health and Human Services and the Secretary of the Interior, is authorized by section 503(a) of the Act to make grants to any State to: (1) Assist in developing and enforcing effective coal or other mine health and safety laws and reguiations; (2) improve State workers' compensation and occupational disease laws and programs related to coal or other mine employment; and (3) promote Federal/State coordination and cooperation in improving the health and safety conditions in coal or other mines.

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[1] The Office of Management and Budget Circular No. A-102 is available for inspection at the States Grants Program Office, Mine Safety and Health Administration, 4015 Wilson Boulevard, Arlington, Virginia 22203.

(b) Grants shall be made to a State through its official coal or other mine inspection or safety agency, and executed by an individual authorized to act for the State Agency.

[44 FR 28588, May 15, 1979, as amended at 47 FR 28095, June 29, 1982]

Subpart B—Application for Grants

§ 46.4 Manner of submission.

(a) An original and two copies of the application for a grant shall be submitted through the State clearinghouse as required by Office of Management and Budget Circular A-95 to the Assistant Secretary of Labor for Mine Safety and Health, U.S. Department of Labor, 4015 Wilson Boulevard, Arlington, Virginia 22203.

(b) The Application for Federal Assistance (Nonconstruction Programs) contained in Attachment M of Office of Management and Budget Circular A-102 (Revised) shall be used when applying for grants.

(c) States shall report deviations from grant budgets and shall request approval for budget revisions in accordance with the provisions of Attachment K, Office of Management and Budget Circular A-102 (Revised).

§ 46.5 Delegation of authority.

General authority and responsibility for the administration and enforcement of mine safety and health programs, including the authority of the Secretary to review applications for grants and to make awards under section 503 of the Act, has been delegated to the Assistant Secretary by Secretary of Labor Order 3-78, effective March 9, 1978. The Assistant Secretary may redelegate authority to such officers and employees as he deems appropriate. The delegation of the Assistant Secretary, therefore, includes the authority to issue, amend, and repeal rules under this part and to provide policy, regulations, and guidlines by which this part is implemented. The Assistant Secretary may, with respect to any grant award, impose additional conditions prior to or at the time of the award when, in his judgment, such conditions are necessary to assure safe and healthful working conditions for individuals working in mines, or to promote the conservation of grant funds.

§ 46.6 Information required.

Applications shall be in the form of proposals, which consistent with the purposes of the Grant must:

(a) Set forth the programs, policies and methods to be followed in carrying out the application in accordance with the purposes of section 503(a) of the Act. An application may provide for: (1) Assistance to States in developing and enforcing effective coal or other mine health and safety laws and regulations consistent with the provisions of section 506 of the Act; (2) improvement to State workers' compensation and occupational disease laws and programs related to coal or other mine employment; and (3) promotion of Federal/State coordination and cooperation in improving the health and safety conditions in the coal or other mines.

(b) Designate the State coal or other mine inspection or safety agency as the sole agency responsible for administering the grant throughout the State, and contain satisfactory evidence that such agency will have the authority to carry out the purpose of a grant made under this part.

(c) Give assurances satisfactory to the Assistant Secretary that such agency has or will have an adequate and competent staff of trained inspectors qualified under the laws of such State to make coal or other mine inspections within such State, if relevant.

(d) Provide for the extension and improvement of the State program for the improvement of coal or other mine health and safety in the State, and provide that no advance notice of an inspection will be provided to anyone.

(e) Contain assurance satisfactory to the Assistant Secretary that grants provided under this part will supplement, no supplant, existing State coal or other mine health and safety programs.

(f) State the period of time during which each of the programs will be pursued.

(g) Contain a financial plan (budget information) submitted on the "Application for Federal Assistance (nonconstruction Programs)" contained in Attachment M of Office of Management and Budget Circular A-102 (revised).

(h) Provide such fiscal control and fund accounting procedures as may be necessary to comply with the requirements of this part to assure proper disbursement and accounting of grants made under this part.

(i) Provide the name and title of the person who will direct the program(s).

(j) Provide the approximate number and general qualifications of the personnel who will work on the program(s).

(k) Indicate the location or locations at which the various projects in the program(s) will be pursued.

(l) Provide assurances satisfactory to the Assistant Secretary that, if the grant is made, the required funds (State share) from non-Federal sources will be forthcoming. State share represents the portion of program costs not borne by the Federal Government. General quidelines for computing State share are defined in Attachment F, Office of Management and Budget Circular A-102 (Revised).

(m) Indicate whether the program(s) or any part of the program(s) have been or will be submitted to other organizations for the purpose of obtaining a grant.

(n) Agree that the official coal or other mine inspection or safety agency designated pursuant to paragraph (b) of this section shall make the reports required by § 46.16 (State monitoring of grant supported activities reports) of this part and shall abide by all other terms and conditions which the Assistant Secretary may prescribe.

Subpart C—Approval of Applications and Limitations

§ 46.8 Defective applications and modifications.

(a) Any application, request for renewal or modification, that does not meet the requirements of the Act and this part shall be returned promptly and the State shall be requested to modify, amend, or revise the application as necessary in order to meet the requirements and to resubmit the application or request for renewal.

(b) The Assistant Secretary will not finally disapprove any State application, request for renewal, or modification, amendment, or revision thereof without first affording the State agency reasonable notice and opportunity for a public hearing, as provided in § 46.11 (Appeals and hearings) of this part.

§ 46.9 Limitations.

(a) Applications shall only be considered for programs that meet the purposes and objectives of section 503 of the Act and this part.

(b) Grants shall be made on a fiscal year basis or portion thereof.

(c) Each grant shall be covered by a grant agreement between the Government and the State. The grant agreement shall set forth the purposes, objectives, total estimated cost of the program during the fiscal year for which the grant is to be made, and the approved financial plan.

(d) Federal funds will be granted on the basis of grant applications and pursuant to the grant agreement, and the amount granted to any State for a fiscal year under this section shall not exceed 80 per centum of the amount expended by such State in such year for carrying out the approved grant. The Assistant Secretary may allocate funds between States and may fix the grant at less than 80 per centum, and the percentages may be unequal between grants and between States. Further, no less than one-half of the funds appropriated for grants will be allocated to coal producing States.

(e) None of the funds granted by the Government or provided by the State shall be used for any purpose not specifically provided in the grant agreement or any modification thereof.

(f) Any State accepting a grant or grants under this part shall agree that neither the Government nor any of its officers, agents, or employees shall be responsible or liable for any loss, expense, damage to property, or for death or bodily injury to persons, which may arise from or be incident to any project or grant coming hereunder, and the State shall agree to hold the Government and its officers, agents, or employees harmless from all such claims.

(g) Reimbursement for travel expenses shall be in accordance with the State's regular lawfully established policies and procedures, except that such reimbursable expenses may not exceed those authorized in Standardized Government Travel Regulations (Federal Property Management Regulations, 41 CFR Parts 101 through 107).[2]

(h) The State shall comply with the requirements of Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d 1970) which provides that no person in the United States shall on the ground of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance, and with the implementing regulation issued by the Secretary of Labor with the approval of the President (29 CFR Part 31). Any grant for a project which involves a federally assisted contract, as defined in Executive Order 11246, as amended, shall be subject to the condition that the grantee shall comply with the requirements of the Executive Order, as amended, which prohibits discrimination by contractors and subcontractors because of race, color, religion, sex, or national origin, and shall comply with the applicable rules, regulations and procedures. The State shall also make assurance that it will not discriminate on the basis of sex and religion (OMB Circular A-102).

(i) Under the provisions of the Federal Hatch Act (Political Activities Act of August 2, 1939, as amended, 5 U.S.C. 1501-1508 (1976)), all State or local agencies, officers and employees whose principal employment is in connection with activities financed by any grant under this part, irrespective of whether the employees are under a merit system, are prohibited, with certain exceptions, from:

(1) Using official authority or influence for the purpose of interfering with or affecting the result of an election or a nomination for office.

(2) Directly or indirectly coercing, attempting to coerce, commanding, or advising any other State or local officer or employee to pay, lend, or contribute anything of value to any party, committee, organization, agency, or person for political purposes.

(3) Being a candidate for elective office.

(j) Inquiries with respect to the provisions of the Federal Hatch Act as it affects grants awarded under this part should be directed to the Office of the Assistant Secretary, Mine Safety and Health Administration, 4015 Wilson Boulevard, Arlington, Virginia 22203.

§ 46.10 Termination.

(a) A State grant may be terminated by the State upon written notice to the Assistant Secretary, specifying the date upon which the State grant shall be terminated, but which date of termination shall not be less than 30 days from the date of the notice.

(b) Any grant awarded under this part may be revoked or terminated, in whole or in part, by the Assistant Secretary at any time within the period of the grant, whenever the Assistant Secretary finds, after giving due notice to the State and affording the State an opportunity for a hearing under § 46.11 (Appeals and hearings) of this part, that the State has failed to comply with the terms and conditions of the grant agreement or the regulations of this part. The State shall be notified of such findings in writing and given the reasons therefor, together with the effective date.

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[2] The Federal Property Management Regulations are available for inspection at the State Grants Program Office, Mine Safety and Health Administration, 4015 Wilson Boulevard, Arlington, Virginia 22203.

§ 46.11 Appeals and hearings.

(a) The proposed disapproval by the Assistant Secretary of any initial State application, request for renewal, or modification, or proposed termination of State grants shall be given to the State by written notice setting forth the reasons for the proposed disapproval or termination. The State, through its designated coal or other mine inspection or safety agency, may appeal such decision by the mailing of a notice of appeal and request for a public hearing to the Assistant Secretary within 30 days after receipt of the notice of proposed disapproval or termination.

(b) A notice of hearing under this section shall be published in the FEDERAL REGISTER and the period of time between such publication and the date fixed for the hearing shall not be less than 30 days. The notice of hearing shall prescribe the rules of the proceeding.

(c) The final decision of the Assistant Secretary disapproving any initial application or modification, or request for renewal, or terminating a grant shall be conclusive unless the State within 30 days from the date of such decision shall file a petition in the United States Court of Appeals for the District of Columbia stating that such decision should be modified or set aside in whole or in part. The filing of a petition shall not stay the application of the decision of the Assistant Secretary except as ordered by the court.

Subpart D—Fiscal and Accounting

§ 46.12 Procedures for obtaining payments.

(a) States shall be paid under one of the methods defined in Attachment J, Office of Management and Budget Circular A-102 (Revised).

(b) States shall comply with the provisions of Attachment A, Office of Management and Budget Circular A-102 (Revised) when operating with Federally advanced funds.

§ 46.13 Accounting records.

(a) State financial management systems for the grant programs shall be maintained in accordance with the provisions of Attachment G, Office of Management and Budget Circular A-102 (Revised).

(b) The State's records relating to each grant, with all supporting and related documents shall, at all reasonable times, be made available, to the following persons, upon request for inspection and audit by such persons: the Assistant Secretary, the Secretary, or by the Comptroller General of the United States or their authorized representatives. If desired, microfilm copies may be substituted in lieu of original records.

(c) The State's records relating to each grant shall be retained and made available until the expiration of three years from the date of the submission of the final expenditure report or, for grants which are renewed annually, from the date of the submission of each annual expenditure report, with the following qualifications:

(1) The records shall be retained beyond the three year period if audit findings have not been resolved.

(2) Records for nonexpendable property which was acquired with Federal grant funds shall be retained for three years after its final disposition.

§ 46.14 Procurement standards.

(a) The State is the responsible authority, without recourse to MSHA, regarding the settlement and satisfaction of all contractual and administrative issues arising out of procurements entered into in support of a grant. This includes but is not limited to disputes, claims, protests of award, source evaluation, or other matters of a contractual nature. Matters concerning violation of law are to be referred to such local, State, or Federal authority as may have proper jurisdiction.

(b) States may use their own procurement regulations which reflect applicable State and local law, rules and regulations provided that procurements made with Federal grant funds adhere to the standards set forth in Attachment O, Office of Management and Budget Circular A-102 (Revised).

§ 46.15 Property management standards and patents and copyrights.

(a) Except as specified in paragraphs (b) (1) and (2) below, the "Property Management Standards" contained in Attachment N of Office of Management and Budget Circular A-102 (Revised) are applicable to all grants.

(b) Specific standards for control of copyrights and patents are:

(1) If any program produces patentable items, patent rights, processes, or inventions, in the course of work aided by a Federal grant, such fact shall be promptly and fully reported to MSHA. MSHA shall determine whether protection on such invention or discovery shall be sought and how the rights of the invention or discovery—including rights under any patent issued thereon—shall be allocated and administered in order to protect interest consistent with the Act.

(2) Where the grant results in a book or other copyrightable material, any such work normally becomes the property of the Government, and the grantee would not be authorized to secure a copyright thereon. However, educational institutions and individuals in the field of education may be granted the right to publish works arising out of the grant provided that the Government secures a royalty-free, non-exclusive, and irrevocable license to publish, reproduce, use, and dispose of the work, and to authorize or ratify the acts of others to do the same.

Subpart E—Reports

§ 46.16 State monitoring of grant-supported activities; reports.

(a) States shall constantly monitor the performance of grant-supported activities to assure that time schedules are being met, projected work units by time periods are being accomplished, and other performance goals are being achieved. This review shall be made for each program, function, or activity of each grant as set forth in the approved grant application.

(b) States shall submit a quarterly performance report for each grant which briefly presents the following for each program, function, or activity involved:

(1) A comparison of actual accomplishments to the goals established for the period. Where the output of grant programs can be readily quantified, such quantitative data shall be related to cost data for computation of unit costs.

(2) Reasons for slippage in those cases where established goals were not met.

(3) Other pertinent information including, when appropriate, analysis and explanation of cost overruns or high unit costs.

(c) States shall submit financial reports in accordance with Attachment H of Office of Management and Budget Circular A-102 (Revised).

(d) Between the required performance reporting dates, events may occur which have significant impact upon the project or program. In such cases, the State shall inform MSHA as soon as the following types of conditions become known:

(1) Problems, delays, or adverse conditions which will materially affect the ability to attain program objectives, prevent the meeting of time schedules and goals, or preclude the attainment of project work units by established time periods. This disclosure shall be accompanied by a statement of the action taken or contemplated and any Federal assistance needed to resolve the situation.

(2) Favorable developments or events which enable meeting time schedules and goals sooner than anticipated or producing more work units than originally projected.

(e) If any performance review conducted by the State discloses the need for change in the budget estimates in accordance with the criteria established in Attachment K, Office of Management and Budget Circular A-102 (Revised), the State shall submit a request for budget revision.

§ 46.17 Acknowledgement of Federal Government participation.

Appropriate acknowledgement shall be given by the State of the Department of Labor's participation in financing each project. Such acknowledgement shall be included in all publications, news releases, and other information media developed to publicize, describe, or report on activities and accomplishments carried out in whole or in part with funds received under provisions of the Act.

Subpart F—Consultation and Cooperation

§ 46.18 Consultation and cooperation.

(a) As contemplated by the Act, the Assistant Secretary will consult and cooperate with the State in accomplishing the purposes of the grant, including, but not limited to, the furnishing of advice and assistance to promote the objectives of the Act and the coordination of projects.

(b) In addition to cooperating in carrying out the purposes of State grants, the Assistant Secretary also shall cooperate with such States in training Federal and State inspectors jointly, and in establishing a system by which States and Federal inspection reports of coal or other mines located in the State are exchanged for the purpose of improving health and safety conditions in such mines.

SUBCHAPTER H—EDUCATION AND TRAINING

PART 48—TRAINING AND RETRAINING OF MINERS

Subpart A—Training and Retraining of Underground Miners

Sec.

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48.28 Annual refresher training of miners; minimum courses of instruction; hours of instruction.
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48.30 Compensation for training.
48.31 Hazard training.
48.32 Appeals procedures.

AUTHORITY: Secs. 101 and 115 (a), (b) and (c) of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291, 1315-1316 (30 U.S.C. 811, 825 (a), (b), and (c)).

SOURCE: 43 FR 47459, Oct. 13, 1978, unless otherwise noted.

Subpart A—Training and Retraining of Underground Miners

§ 48.1 Scope.

The provisions of this Subpart A set forth the mandatory requirements for submitting and obtaining approval of programs for training and retraining miners working in underground mines. Requirements regarding compensation for training and retraining are also included. The requirements for training and retraining miners working at surface mines and surface areas of underground mines are set forth in Subpart B of this part.

§ 48.2 Definitions.

For the purposes of this Subpart A—

(a)(1) "Miner" means, for purposes of §§ 48.3 through 48.10 of this Subpart A, any person working in an underground mine and who is engaged in the extraction and production process, or who is regularly exposed to mine hazards, or who is a maintenance or service worker employed by the operator or a maintenance or service worker contracted by the operator to work at the mine for frequent or extended periods. This definition shall include the operator if the operator works underground on a continuing, even if irregular, basis. Short term, specialized contact workers, such as drillers and blasters, who are engaged in the extraction and production process and who have received training under § 48.6 (Training of newly-employed experienced miners) of this Subpart A may, in lieu of subsequent training under that section for each new employment, receive training under § 48.11 (Hazard training) of this Subpart A. This definition does not include:

(i) Workers under Subpart C of this part 48, including shaft and slope workers, workers engaged in construction activities ancillary to shaft and slope sinking, and workers engaged in the construction of major additions to an existing mine which requires the mine to cease operations;

(ii) Supervisory personnel subject to MSHA approved State certification requirements; and,

(iii) Any person covered under paragraph (a)(2) of this section.

(2) Miner means, for purposes of § 48.11 (Hazard training) of this Subpart A, any person working in an underground mine and excluding persons covered under paragraph (a)(1) of this section and Subpart C of this part and supervisory personnel subject to MSHA approved State certification requirements. This definition includes any delivery, office, or scientific worker or occasional, short term maintenance or service worker contracted by the operator, and any student engaged in academic projects involving his or her extended presence at the mine.

(b) "Experienced miner" means a person who is employed as an underground miner, as defined in paragraph (a)(1) of this section, on the effective date of these rules; or a person who has received training acceptable to MSHA from an appropriate State agency within the preceding 12 months; or a person who has had at least 12 months experience working in an underground mine during the preceding 3 years; or a person who has received the training for a new miner within the preceding 12 months as prescribed in § 48.5 (Training of new miners) of this Subpart A.

(c) "New miner" means a miner who is not an experienced miner.

(d) "Normal working hours" means a period of time during which a miner is otherwise scheduled to work. This definition does not preclude scheduling training classes on the sixth or seventh working day if such a work schedule has been established for a sufficient period of time to be accepted as the operator's common practice. Miners shall be paid at a rate of pay which shall correspond to the rate of pay they would have received had they been performing their normal work tasks.

(e) "Operator" means any owner, lessee, or other person who operates, controls or supervises an underground mine; or any independent contractor identified as an operator performing services or construction at such mine.

(f) "Task" means a work assignment that includes duties of a job that occur on a regular basis and which requires physical abilities and job knowledge.

(g) "Act" means the Federal Mine Safety and Health Act of 1977.

§ 48.3 Training plans; time of submission; where filed; information required; time for approval; method for disapproval; commencement of training; approval of instructors.

(a) Each operator of an underground mine shall have an MSHA approved plan containing programs for training new miners, training newly-employed experienced miners, training miners for new tasks, annual refresher training, and hazard training for miners as follows:

(1) In the case of an underground mine which is operating on the effective date of this Subpart A, the operator of the mine shall submit such plan for approval within 90 days after the effective date of this Subpart A.

(2) Within 60 days after the operator submits the plan for approval, unless extended by MSHA, the operator shall have an approved plan for the mine.

(3) In the case of a new underground mine which is to be opened or a mine which is to be reopened or reactivated after the effective date of this Subpart A, the operator shall have an approved plan prior to opening the new mine, or reopening or reactivating the mine.

(b) The training plan shall be filed with the District Manager for the area in which the mine is located.

(c) Each operator shall submit to the District Manager the following information:

(1) The company name, mine name, and MSHA identification number of the mine.

(2) The name and position of the person designated by the operator who is responsible for health and safety

training at the mine. This person may be the operator.

(3) A list of MSHA approved instructors with whom the operator proposes to make arrangements to teach the courses, and the courses each instructor is qualified to teach.

(4) The location where training will be given for each course.

(5) A description of the teaching methods and the course materials which are to be used in training.

(6) The approximate number of miners employed at the mine and the maximum number who will attend each session of training.

(7) The predicted time or periods of time when regularly scheduled refresher training will be given. This schedule shall include the titles of courses to be taught, the total number of instruction hours for each course, and the predicted time and length of each session of training.

(8) For the purposes of § 48.7 (New task training of miners) of this Subpart A, the operator shall submit:

(i) A complete list of task assignments to correspond with the definition of "task" in § 48.2 (f) of this Subpart A.

(ii) The titles of personnel conducting the training for this section.

(iii) The outline of training procedures used in training miners in those work assignments listed according to paragraph (c)(8)(i) of this section.

(iv) The evaluation procedures used to determine the effectiveness of training under § 48.7 of this Subpart A.

(d) The operator shall furnish to the representative of the miners a copy of the training plan two weeks prior to its submission to the District Manager. Where a miners' representative is not designated, a copy of the plan shall be posted on the mine bulletin board 2 weeks prior to its submission to the District Manager. Written comments received by the operator from miners or their representatives shall be submitted to the District Manager. Miners or their representatives may submit written comments directly to the District Manager.

(e) All training required by the training plan submitted to and approved by the District Manager as required by this Subpart A shall be subject to evaluation by the District Manager to determine the effectiveness of the training programs. If it is deemed necessary, the District Manager may require changes in, or additions to, programs. Upon request from the District Manager the operator shall make available for evaluation the instructional materials, handouts, visual aids and other teaching accessories used or to be used in the training programs. Upon request from the District Manager the operator shall provide information concerning the schedules of upcoming training.

(f) The operator shall make a copy of the MSHA approved training plan available at the mine site for MSHA inspection and for examination by the miners and their representatives.

(g) Except as provided in § 48.7 (New task training of miners) and § 48.11 (Hazard training) of this Subpart A, all courses shall be conducted by MSHA approved instructors.

(h) Instructors shall be approved by the District Manager in one or more of the following ways:

(1) Instructors shall take an instructor's training course conducted by the District Manager or given by persons designated by the District Manager to give such instruction; and instructors shall have satisfactorily completed a program of instruction approved by the Office of Educational Policy and Development, MSHA, in the subject matter to be taught.

(2) Instructors may be designated by MSHA as approved instructors to teach specific courses based on written evidence of the instructors' qualifications and teaching experience.

(3) At the discretion of the District Manager, instructors may be designated by MSHA as approved instructors to teach specific courses based on the performance of the instructors while teaching classes monitored by MSHA. Operators shall indicate in the training plans submitted for approval whether they want to have instructors approved based on monitored performance. The District Manager shall consider such factors as the size of the mine, the number of employees, the mine safety record and remoteness from a training facility when deter-

mining whether instructor approval based on monitored performance is appropriate.

(4) On the effective date of this Subpart A, cooperative instructors who have been designated by MSHA to teach MSHA approved courses and who have taught such courses within the 24 months prior to the effective date of this Subpart shall be considered approved instructors for such courses.

(i) Instructors may have their approval revoked by MSHA for good cause which may include not teaching a course at least once every 24 months. Before any revocation is effective, the District Manager must send written reasons for revocation to the instructor and the instructor shall be given an opportunity to demonstrate or achieve compliance before the District Manager on the matter. A decision by the District Manager to revoke an instructor's approval may be appealed by the instructor to the Administrator for Coal Mine Safety and Health or Administrator for Metal and Nonmetal Safety and Health, as appropriate, MSHA, 4015 Wilson Boulevard, Arlington, Va. 22203. Such an appeal shall be submitted to the Administrator within 5 days of notification of the District Manager's decision. Upon revocation of an instructor's approval, the District Manager shall immediately notify operators who use the instructor for training.

(j) The District Manager for the area in which the mine is located shall notify the operator and the miners' representative, in writing, within 60 days from the date on which the training plan is filed, of the approval or status of the approval of the training programs.

(1) If revisions are required for approval, or to retain approval thereafter, the revisions required shall be specified to the operator and the miners' representative and the operator and the miners' representative shall be afforded an opportunity to discuss the revisions with the District Manager, or to propose alternate revisions or changes. The District Manager, in consultation with the operator and the representative of the miners, shall fix a time within which the discussion will be held, or alternate revisions or changes submitted, before final approval is made.

(2) The District Manager may approve separate programs of the training plan and withhold approval of other programs, pending discussion of revisions or submission of alternate revisions or changes.

(k) Except as provided under § 48.8(c) (Annual refresher training of miners) of this Subpart A, the operator shall commence training of miners within 60 days after approval of the training plan, or approved programs of the training plan.

(l) The operator shall notify the District Manager of the area in which the mine is located, and the miners' representative of any changes or modifications the operator proposes to make in the approved training plan. The operator shall obtain the approval of the District Manager for such changes or modifications.

(m) In the event the District Manager disapproves a training plan or a proposed modification of a training plan or requires changes in a training plan or modification, the District Manager shall notify the operator and the miners' representative in writing of:

(1) The specific changes or items of deficiency.

(2) The action necessary to effect the changes or bring the disapproved training plan or modification into compliance.

(3) The deadline for completion of remedial action to effect compliance, which shall serve to suspend punitive action under the provisions of sections 104 and 110 of the Act and other related regulations until that established deadline date, except that no such suspension shall take place in imminent danger situations.

(n) The operator shall post on the mine bulletin board, and provide to the miners' representative, a copy of all MSHA revisions and decisions which concern the training plan at the mine and which are issued by the District Manager

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(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[43 FR 47459, Oct. 13, 1978; 44 FR 1980, Jan. 9, 1979, as amended at 47 FR 14696, Apr. 6, 1982; 47 FR 23640, May 28, 1982; 47 FR 28095, June 29, 1982]

§ 48.4 Cooperative training program.

(a) An operator of a mine may conduct his own training programs, or may participate in training programs conducted by MSHA, or may participate in MSHA approved training programs conducted by State or other Federal agencies, or associations of mine operators, miners' representatives, other mine operators, private associations, or educational institutions.

(b) Each program and course of instruction shall be given by instructors who have been approved by MSHA to instruct in the courses which are given, and such courses and the training programs shall be adapted to the mining operations and practices existing at the mine and shall be approved by the District Manager for the area in which the mine is located.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23640, May 28, 1982]

§ 48.5 Training of new miners; minimum courses of instruction; hours of instruction.

(a) Each new miner shall receive no less than 40 hours of training as prescribed in this section before such miner is assigned to work duties. Such training shall be conducted in conditions which as closely as practicable duplicate actual underground conditions, and approximately 8 hours of training shall be given at the minesite.

(b) The training program for new miners shall include the following courses:

(1) *Instruction in the statutory rights of miners and their representatives under the Act; authority and responsibility of supervisors.* The course shall include instruction in the statutory rights of miners and their representatives under the Act, including a discussion of section 2 of the Act; a review and description of the line of authority of supervisors and miners' representatives and the responsibilities of such supervisors and miners' representatives; and an introduction to the operator's rules and the procedures for reporting hazards.

(2) *Self-rescue and respiratory devices.* The course shall include instruction and demonstration in the use, care, and maintenance of self-rescue and respiratory devices used at the mine. Such course shall be given before the new miner goes underground.

(3) *Entering and leaving the mine; transportation; communications.* The course shall include instruction on the procedures in effect for entering and leaving the mine; the check-in and checkout system in effect at the mine; the procedures for riding on and in mine conveyances; the controls in effect for the transportation of miners and materials; and the use of the mine communication systems, warning signals, and directional signs.

(4) *Introduction to the work environment.* The course shall include a visit and tour of the mine, or portions of the mine which are representative of the entire mine. A method of mining utilized at the mine shall be observed and explained.

(5) *Mine map; escapeways; emergency evacuation; barricading.* The course shall include a review of the mine map; the escapeway system; the escape, firefighting, and emergency evacuation plans in effect at the mine; and the location of abandoned areas. Also included shall be an introduction to the methods of barricading and the locations of the barricading materials, where applicable. The program of instruction for escapeways and emergency evacuation plans approved by the District Manager shall be used for this course.

(6) *Roof or ground control and ventilation plans.* The course shall include an introduction to and instruction on the roof or ground control plan in effect at the mine and procedures for roof and rib or ground control; and an introduction to and instruction on the ventilation plan in effect at the mine and the procedures for maintaining and controlling ventilation.

(7) *Health.* The course shall include instruction on the purpose of taking dust, noise, and other health measurements, and any health control plan in effect at the mine shall be explained. The health provisions of the

act and warning labels shall also be explained.

(8) *Cleanup; rock dusting.* The course shall include instruction on the purpose of rock dusting and the cleanup and rock dusting program in effect at the mine, where applicable.

(9) *Hazard recognition.* The course shall include the recognition and avoidance of hazards present in the mine, particularly any hazards related to explosives where explosives are used or stored at the mine.

(10) *Electrical hazards.* The course shall include recognition and avoidance of electrical hazards.

(11) *First aid.* The course shall include instruction in first aid methods acceptable to MSHA.

(12) *Mine gases.* The course shall include instruction in the detection and avoidance of hazards associated with mine gases.

(13) *Health and safety aspects of the tasks to which the new miner will be assigned.* The course shall include instruction in the health and safety aspects of the tasks to be assigned, the safe work procedures of such tasks, and the mandatory health and safety standards pertinent to such tasks.

(14) Such other courses as may be required by the District Manager based on circumstances and conditions at the mine.

(c) Methods, including oral, written, or practical demonstration, to determine successful completion of the training shall be included in the training plan. The methods for determining such completion shall be administered to the miner before he is assigned work duties.

(d) Upon proof by an operator that a newly employed miner has received the courses and hours of instruction set forth in paragraphs (a) and (b) of this section within 12 months preceding initial employment at a mine, such miner need not repeat the training, but the operator shall give and the miner shall receive and complete the instruction and progam of training set forth in paragraph (b) of § 48.6 (Training of newly employed experienced miners), and § 48.7 (New task training of miners), if applicable, before commencing work.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23640, May 28, 1982]

§ 48.6 Training of newly employed experienced miners; minimum courses of instruction.

(a) A newly employed experienced miner shall receive and complete training in the program of instruction prescribed in this section before such miner is assigned to work duties.

(b) The training program for newly employed experienced miners shall include the folowing:

(1) *Introduction to work environment.* The course shall include a visit and tour of the mine. The methods of mining utilized at the mine shall be observed and explained.

(2) *Mandatory health and safety standards.* The course shall include the mandatory health and safety standards pertinent to the tasks to be assigned.

(3) *Authority and responsibility of supervisors and miners' representatives.* The course shall include a review and description of the line of authority of supervisors and miners' representatives and the responsibilities of such supervisors and miners' representatives; and an introduction to the operator's rules and the procedures for reporting hazards.

(4) *Entering and leaving the mine; transportation; communications.* The course shall include instruction in the procedures in effect for entering and leaving the mine; the check-in and checkout system in effect at the mine; the procedures for riding on and in mine conveyances; the controls in effect for the transportation of miners and materials; and the use of the mine communication systems, warning signals, and directional signs.

(5) *Mine map; escapeways; emergency evacuation; barricading.* The course shall include a review of the mine map; the escapeway system; the escape, firefighting, and emergency evacuation plans in effect at the mine; the location of abandoned areas; and, where applicable, methods of barricading and the locations of barricading materials. The program of instruction for escapeways and emergency evacuation plans approved by the District Manager shall be used for this course.

(6) *Roof or ground control and ventilation plans.* The course shall include an introduction to and instruction on the roof or ground control plan in effect at the mine and procedures for roof and rib or ground control; and an introduction to and instruction on the ventilation plan in effect at the mine and the procedures for maintaining and controlling ventilation.

(7) *Hazard recognition.* The course shall include the recognition and avoidance of hazards present in the mine, particularly any hazards related to explosives where explosives are used or stored at the mine.

(8) Such other courses as may be required by the District Manager based on circumstances and conditions at the mine.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23640, May 28, 1982]

§ 48.7 Training of miners assigned to a task in which they have had no previous experience; minimum courses of instruction.

(a) Miners assigned to new work tasks as mobile equipment operators, drilling machine operators, haulage and conveyor systems operators, roof and ground control machine operators, and those in blasting operations shall not perform new work tasks in these categories until training prescribed in this paragraph and paragraph (b) of this section has been completed. This training shall not be required for miners who have been trained and who have demonstrated safe operating procedures for such new work tasks within 12 months preceding assignment. This training shall also not be required for miners who have performed the new work tasks and who have demonstrated safe operating procedures for such new work tasks within 12 months preceding assignment. The training program shall include the following:

(1) *Health and safety aspects and safe operating procedures for work tasks, equipment, and machinery.* The training shall include instruction in the health and safety aspects and the safe operating procedures related to the assigned tasks, and shall be given in an on-the-job environment; and

(2) (i) *Supervised practice during nonproduction.* The training shall include supervised practice in the assigned tasks, and the performance of work duties at times or places where production is not the primary objective; or

(ii) *Supervised operation during production.* The training shall include, while under direct and immediate supervision and production is in progress, operation of the machine or equipment and the performance of work duties.

(3) *New or modified machines and equipment.* Equipment and machine operators shall be instructed in safe operating procedures applicable to new or modified machines or equipment to be installed or put into operation in the mine, which require new or different operating procedures.

(4) Such other courses as may be required by the District Manager based on circumstances and conditions at the mine.

(b) Miners under paragraph (a) of this section shall not operate the equipment or machine or engage in blasting operations without direction and immediate supervision until such miners have demonstrated safe operating procedures for the equipment or machine or blasting operation to the operator or the operator's agent.

(c) Miners assigned a new task not covered in paragraph (a) of this section shall be instructed in the safety and health aspects and safe work procedures of the task, prior to performing such task.

(d) Any person who controls or directs haulage operations at a mine shall receive and complete training courses in safe haulage procedures related to the haulage system, ventilation system, firefighting procedures, and emergency evacuation procedures in effect at the mine before assignment to such duties.

(e) All training and supervised practice and operation required by this section shall be given by a qualified trainer, or a supervisor experienced in the assigned tasks, or other person experienced in the assigned tasks.

[43 FR 47459, Oct. 13, 1978, as amended at 44 FR 1980, Jan. 9, 1979; 47 FR 23640, May 28, 1982]

§ 48.8 Annual refresher training of miners; minimum courses of instruction; hours of instruction.

(a) Each miner shall receive a minimum of 8 hours of annual refresher training as prescribed in this section.

(b) The annual refresher training program for all miners shall include the following courses of instruction:

(1) *Mandatory health and safety standards.* The course shall include mandatory health and safety standard requirements which are related to the miner's tasks.

(2) *Transportation controls and communication systems.* The course shall include instruction on the procedures for riding on and in mine conveyances; the controls in effect for the transportation of miners and materials; and the use of the mine communication systems, warning signals, and directional signs.

(3) *Barricading.* The course shall include a review of the methods of barricading and locations of barricading materials, where applicable.

(4) *Roof or ground control and ventilation plans.* The course shall include a review of roof or ground control plans in effect at the mine and the procedures for maintaining and controlling ventilation.

(5) *First aid.* The course shall include a review of first aid methods acceptable to MSHA.

(6) *Electrical hazards.* The course shall include recognition and avoidance of electrical hazards.

(7) *Prevention of accidents.* The course shall include a review of accidents and causes of accidents, and instruction in accident prevention in the work environment.

(8) *Self-rescue devices and respiratory devices.* The course shall include instruction in the use, care, and maintenance of self-rescue and respiratory devices.

(9) *Explosives.* The course shall include a review and instruction on the hazards related to explosives. The only exception to this course component is when there are no explosives used or stored on the mine property.

(10) *Mine gases.* The course shall include instruction in the detection and avoidance of hazards associated with mine gases.

(11) *Health.* The course shall include instruction on the purpose of taking dust, noise, and other health measurements and any health control plan in effect at the mine shall be explained. The health provisions of the Act and warning labels shall also be explained.

(12) Such other courses as may be required by the District Manager based on circumstances and conditions at the mine.

(c) All experienced miners already employed at a mine on the effective date of the Act (March 9, 1978) shall receive refresher training, as prescribed in this section and in accordance with the approved plan, to begin not more than 90 days after the date of approval of the training program required by this Subpart A.

(d) Where annual refresher training is conducted periodically, such sessions shall not be less than 30 minutes of actual instruction time and the miners shall be notified that the session is part of annual refresher training.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23640, May 28, 1982]

§ 48.9 Records of training.

(a) Upon a miner's completion of each MSHA approved training program, the operator shall record and certify on MSHA form 5000-23 that the miner has received the specified training. A copy of the training certificate shall be given to the miner at the completion of the training. The training certificates for each miner shall be available at the minesite for inspection by MSHA and for examination by the miners, the miner's representative, and State inspection agencies. When a miner leaves the operator's employ, the miner shall be entitled to a copy of his training certificates.

(b) False certification that training was given shall be punishable under section 110 (a) and (f) of the Act.

(c) Copies of training certificates for currently employed miners shall be kept at the minesite for 2 years, or for

60 days after termination of employment.

OMB Control No. 1291-0070. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 14706, Apr. 6, 1982]

§ 48.10 Compensation for training.

(a) Training shall be conducted during normal working hours; miners attending such training shall receive the rate of pay as provided in § 48.2(d) (Definition of normal working hours) of this Subpart A.

(b) If such training shall be given at a location other than the normal place of work, miners shall be compensated for the additional cost, such as mileage, meals, and lodging, they may incur in attending such training sessions.

§ 48.11 Hazard training.

(a) Operators shall provide to those miners, as defined in § 48.2(a)(2) (Definition of miner) of this Subpart A, a training program before such miners commence their work duties. This training program shall include the following instruction, which is applicable to the duties of such miners:

(1) Hazard recognition and avoidance;

(2) Emergency and evacuation procedures;

(3) Health and safety standards, safety rules, and safe working procedures;

(4) Self-rescue and respiratory devices; and

(5) Such other instruction as may be required by the District Manager based on circumstances and conditions at the mine.

(b) Miners shall receive the instruction required by this section at least once every 12 months.

(c) The training program required by this section shall be submitted with the training plan required by § 48.3(a) (Training plans: Submission and approval) of this Subpart A and shall include a statement on the methods of instruction to be used.

(d) In accordance with § 48.9 (Records of training) of this Subpart A, the operator shall maintain and make available for inspection certificates that miners have received the hazard training required by this section.

(e) Miners subject to hazard training shall be accompanied at all times while underground by an experienced miner, as defined in § 48.2(b) (Definition of miner) of this Subpart A.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23640, May 25, 1982]

§ 48.12 Appeals procedures.

The operator, miner, and miners' representative shall have the right of appeal from a decision of the District Manager.

(a) In the event an operator, miner, or miners' representative decides to appeal a decision by a District Manager, such an appeal shall be submitted, in writing, to the Administrator for Coal Mine Safety and Health or Administrator for Metal and Nonmetal Safety and Health, as appropriate, MSHA, 4015 Wilson Boulevard, Arlington, Va. 22203, within 30 days of notification of the District Manager's decision.

(b) The Administrator may require additional information from the operator, the miners, or their representatives, and the District Manager, if the Administrator determines such information is necessary.

(c) The Administrator shall render a decision on the appeal within 30 days after receipt of the appeal.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23640, May 28, 1982]

Subpart B—Training and Retraining of Miners Working at Surface Mines and Surface Areas of Underground Mines

§ 48.21 Scope.

The provisions of this Subpart B set forth the mandatory requirements for submitting and obtaining approval of programs for training and retraining miners working at surface mines and surface areas of underground mines. Requirements regarding compensation for training and retraining are also included. The requirements for training and retraining miners working in underground mines are set forth in Subpart A of this part.

§ 48.22 Definitions.

For the purposes of this Subpart B—

(a)(1) "Miner" means, for purposes of §§ 48.23 through 48.30 of this Subpart B, any person working in a surface mine or surface areas of an underground mine and who is engaged in the extraction and production process, or who is regularly exposed to mine hazards, or who is a maintenance or service worker employed by the operator or a maintenance or service worker contracted by the operator to work at the mine for frequent or extended periods. This definition shall include the operator if the operator works at the mine on a continuing, even if irregular, basis. Short-term, specialized contract workers, such as drillers and blasters, who are engaged in the extraction and production process and who have received training under § 48.26 (Training of newly employed experienced miners) of this Subpart B, may in lieu of subsequent training under that section for each new employment, receive training under § 48.31 (Hazard training) of this Subpart B. This definition does not include:

(i) Construction workers and shaft and slope workers under Subpart C of this Part 48;

(ii) Supervisory personnel subject to MSHA approved State certification requirements; and

(iii) Any person covered under paragraph (a)(2) of this section.

(2) Miner means, for purposes of § 48.31 (Hazard training) of this Subpart B, any person working in a surface mine or surface areas of an underground mine excluding persons covered under paragraph (a)(1) of this section and Subpart C of this part and supervisory personnel subject to MSHA approved state certification requirements. This definition includes any delivery, office, or scientific worker, or occasional, short-term maintenance or service worker contracted by the operator, and any student engaged in academic projects involving his or her extended presence at the mine.

(b) "Experienced miner" means a person who is employed as a miner, as defined in paragraph (a)(1) of this section, on the effective date of these rules; or a person who has received training acceptable to MSHA from an appropriate State agency within the preceding 12 months; or a person who has had at least 12 months' experience working in a surface mine or surface area of an underground mine during the preceding 3 years; or a person who has received the training for a new miner within the preceding 12 months as prescribed in § 48.25 (Training of new miners) of this Subpart B.

(c) "New miner" means a miner who is not an experienced miner.

(d) "Normal working hours" means a period of time during which a miner is otherwise scheduled to work. This definition does not preclude scheduling training classes on the sixth or seventh working day if such a work schedule has been established for a sufficient period of time to be accepted as the operator's common practice. Miners shall be paid at a rate of pay which shall correspond to the rate of pay they would have received had they been performing their normal work tasks.

(e) "Operator" means any owner, lessee, or other person who operates, controls, or supervises a surface mine or surface area of an underground mine; or any independent contractor identified as an operator performing services or construction at such time.

(f) "Task" means a work assignment that includes duties of a job that occur on a regular basis and which requires physical abilitities and job knowledge.

(g) "Act" means the Federal Mine Safety and Health Act of 1977.

[43 FR 47459, Oct. 13, 1978; 44 FR 1980, Jan. 9, 1979]

§ 48.23 Training plans; time of submission; where filed; information required; time for approval; method for disapproval; commencement of training; approval of instructors.

(a) Each operator of a mine shall have an MSHA approved plan containing programs for training new miners, training newly-employed experienced miners, training miners for new tasks, annual refresher training, and hazard training for miners as follows:

(1) In the case of a mine which is operating on the effective date of this

Subpart B, the operator of the mine shall submit such plan for approval within 150 days after the effective date of this Subpart B.

(2) Within 60 days after the operator submits the plan for approval, unless extended by MSHA, the operator shall have an approved plan for the mine.

(3) In the case of a new mine which is to be opened or a mine which is to be reopened or reactivated after the effective date of this Subpart B, the operator shall have an approved plan prior to opening the new mine, or reopening or reactivating the mine unless the mine is reopened or reactivated periodically using portable equipment and mobile teams of miners as a normal method of operation by the operator. The operator to be so excepted shall maintain an approved plan for training covering all mine locations which are operated with portable equipment and mobile teams of miners.

(b) The training plan shall be filed with the District Manager for the area in which the mine is located.

(c) Each operator shall submit to the District Manager the following information:

(1) The company name, mine name, and MSHA identification number of the mine.

(2) The name and position of the person designated by the operator who is responsible for health and safety training at the mine. This person may be the operator.

(3) A list of MSHA approved instructors with whom the operator proposes to make arrangements to teach the courses, and the courses each instructor is qualified to teach.

(4) The location where training will be given for each course.

(5) A description of the teaching methods and the course materials which are to be used in training.

(6) The approximate number of miners employed at the mine and the maximum number who will attend each session of training.

(7) The predicted time or periods of time when regularly scheduled refresher training will be given. This schedule shall include the titles of courses to be taught, the total number of instruction hours for each course, and the predicted time and length of each session of training.

(8) For the purposes of § 48.27 (New task training of miners) of this Subpart B, the operator shall submit:

(i) A complete list of task assignments to correspond with the definition of "task" in § 48.22(f) of this Subpart B.

(ii) The titles of personnel conducting the training for this section.

(iii) The outline of training procedures used in training miners in those work assignments listed according to paragraph (c)(8)(i) of this section.

(iv) The evaluation procedures used to determine the effectiveness of training under § 48.27 of this Subpart B.

(d) The operator shall furnish to the representative of the miners a copy of the training plan 2 weeks prior to its submission to the District Manager. Where a miners' representative is not designated, a copy of the plan shall be posted on the mine bulletin board 2 weeks prior to its submission to the District Manager. Written comments received by the operator from miners or their representatives shall be submitted to the District Manager. Miners or their representatives may submit written comments directly to the District Manager.

(e) All training required by the training plan submitted to and approved by the District Manager as required by this Subpart B shall be subject to evaluation by the District Manager to determine the effectiveness of the training programs. If it is deemed necessary, the District Manager may require changes in, or additions to, programs. Upon request from the District Manager the operator shall make available for evaluation the instructional materials, handouts, visual aids, and other teaching accessories used or to be used in the training programs. Upon request from the District Manager the operator shall provide information concerning schedules of upcoming training.

(f) The operator shall make a copy of the MSHA approved training plan available at the mine site for MSHA inspection and examination by the miners and their representatives.

(g) Except as provided in § 48.27 (New task training of miners) and § 48.31 (Hazard training) of this Subpart B, all courses shall be conducted by MSHA approved instructors.

(h) Instructors shall be approved by the District Manager in one or more of the following ways:

(1) Instructors shall take an instructor's training course conducted by the District Manager or given by persons designated by the District Manager to give such instruction; and instructors shall have satisfactorily completed a program of instruction approved by the Office of Educational Policy and Development, MSHA, in the subject matter to be taught.

(2) Instructors may be designated by MSHA as approved instructors to teach specific courses based on written evidence of the instructors' qualifications and teaching experience.

(3) At the discretion of the District Manager, instructors may be designated by MSHA as approved instructors to teach specific courses based on the performance of the instructors while teaching classes monitored by MSHA. Operators shall indicate in training plans submitted for approval whether they want to have instructors approved based on monitored performance. The District Manager shall consider such factors as the size of the mine, the number of employees, the mine safety record and remoteness from a training facility when determining whether instructor approval based on monitored performance is appropriate.

(4) On the effective date of this Subpart B, cooperative instructors who have been designated by MSHA to teach MSHA approved courses and who have taught such courses within 24 months prior to the effective date of this subpart shall be considered approved instructors for such courses.

(i) Instructors may have their approval revoked by MSHA for good cause which may include not teaching a course at least once every 24 months. Before any revocation is effective, the District Manager must send written reasons for revocation to the instructor and the instructor shall be given an opportunity to demonstrate or achieve compliance before the District Manager on the matter. A decision by the District Manager to revoke an instructor's approval may be appealed by the instructor to the Administrator for Coal Mine Safety and Health or Administrator for Metal and Nonmetal Safety and Health, as appropriate, MSHA, 4015 Wilson Boulevard, Arlington, Va. 22203. Such an appeal shall be submitted to the Administrator within 5 days of notification of the District Manager's decision. Upon revocation of an instructor's approval, the District Manager shall immediately notify operators who use the instructor for training.

(j) The District Manager for the area in which the mine is located shall notify the operator and the miners' representative, in writing, within 60 days from the date on which the training plan is filed, of the approval or status of the approval of the training programs.

(1) If revisions are required for approval, or to retain approval thereafter, the revisions required shall be specified to the operator and the miners' representative and the operator and the miners' representative shall be afforded an opportunity to discuss the revisions with the District Manager, or propose alternate revisions or changes. The District Manager, in consultation with the operator and the representative of miners, shall fix a time within which the discussion will be held, or alternate revisions or changes submitted, before final approval is made.

(2) The District Manager may approve separate programs of the training plan and withhold approval of other programs, pending discussion of revisions or submission of alternate revisions or changes.

(k) Except as provided under § 48.28(c) (Annual refresher training of miners) of this Subpart B, the operator shall commence training of miners within 60 days after approval of the training plan, or approved programs of the training plan.

(l) The operator shall notify the District Manager of the area in which the mine is located and the miners' representative of any changes of modifications which the operator proposes to make in the approval training plan.

The operator shall obtain the approval of the District Manager for such changes or modifications.

(m) In the event the District Manager disapproves a training plan or a proposed modification of a training plan or requires changes in a training plan or modification, the District Manager shall notify the operator and the miners' representative in writing of:

(1) The specific changes or items of deficiency.

(2) The action necessary to effect the changes or bring the disapproved training plan or modification into compliance.

(3) The deadline for completion of remedial action to effect compliance, which shall serve to suspend punitive action under the provisions of sections 104 and 110 of the Act and other related regulations until that established deadline date, except that no such suspension shall take place in imminent danger situations.

(n) The operator shall post on the mine bulletin board, and provide to the miners' representative, a copy of all MSHA revisions and decisions which concern the training plan at the mine and which are issued by the District Manager.

OMB CONTROL No. 1219-0009. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 14696, Apr. 6, 1982; 47 FR 23640, May 28, 1982; 47 FR 28095, June 29, 1982]

§ 48.24 Cooperative training program.

(a) An operator of a mine may conduct his own training programs, or may participate in training programs conducted by MSHA, or may participate in MSHA approved training programs conducted by State or other Federal agapproval; encies, or associations of mine operators, miners' representatives, other mine operators, private associations, or educational institutions.

(b) Each program and course of instruction shall be given by instructors who have been approved by MSHA to instruct in the courses which are given, and such courses and the training programs shall be adapted to the mining operations and practices existing at the mine and shall be approved by the District Manager for the area in which the mine is located.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23641, May 28, 1982]

§ 48.25 Training of new miners; minimum courses of instruction; hours of instruction.

(a) Each new miner shall receive no less than 24 hours of training as prescribed in this section. Except as otherwise provided in this paragraph, new miners shall receive this training before they are assigned to work duties. At the discretion of the District Manager, new miners may receive a portion of this training after assignment to work duties: *Provided*, That no less than 8 hours of training shall in all cases be given to new miners before they are assigned to work duties. The following courses shall be included in the 8 hours of training: Introduction to work environment, hazard recognition, and health and safety aspects of the tasks to which the new miners will be assigned. Following the completion of this preassignment training, new miners shall then receive the remainder of the required 24 hours of training, or up to 16 hours, within 60 days. Operators shall indicate in the training plans submitted for approval whether they want to train new miners after assignment to duties and for how many hours. In determining whether new miners may be given this training after they are assigned duties, the District Manager shall consider such factors as the mine safety record, rate of employee turnover and mine size. Miners who have not received the full 24 hours of new miner training shall be required to work under the close supervision of an experienced miner.

(b) The training program for new miners shall include the following courses:

(1) *Instruction in the statutory rights of miners and their representatives under the Act; authority and responsibility of supervisors.* The course shall include instruction in the statutory rights of miners and their representatives under the Act, including a discussion of section 2 of the Act; a

review and description of the line of authority of supervisors and miners' representatives and the responsibilities of such supervisors and miners' representatives; and an introduction to the operator's rules and the procedures for reporting hazards.

(2) *Self-rescue and respiratory devices.* The course shall include instruction and demonstration in the use, care, and maintenance of self-rescue and respiratory devices, where applicable.

(3) *Transportation controls and communication systems.* The course shall include instruction on the procedures in effect for riding on and in mine conveyances where applicable; the controls for the transportation of miners and materials; and the use of mine communication systems, warning signals, and directional signs.

(4) *Introduction to work environment.* The course shall include a visit and tour of the mine, or portions of the mine which are representative of the entire mine. The method of mining or operation utilized shall be observed and explained.

(5) *Escape and emergency evacuation plans; firewarning and firefighting.* The course shall include a review of the mine escape system, and escape and emergency evacuation plans in effect at the mine; and instruction in the firewarning signals and firefighting procedures.

(6) *Ground control; working in areas of highwalls, water hazards, pits and spoil banks; illumination and night work.* The course shall include, where applicable, and introduction to and instruction on the highwall and ground control plans in effect at the mine; procedures for working safely in areas of highwalls, water hazards, pits and spoil banks; the illumination of work areas; and safe work procedures during the hours of darkness.

(7) *Health.* The course shall include instruction on the purpose of taking dust measurements, where applicable, and noise and other health measurements, and any health control plan in effect at the mine shall be explained. The health provisions of the Act and warning labels shall also be explained.

(8) *Hazard recognition.* The course shall include the recognition and avoidance of hazards present in the mine.

(9) *Electrical hazards.* The course shall include recognition and avoidance of electrical hazards.

(10) *First aid.* The course shall include instruction in first aid methods acceptable to MSHA.

(11) *Explosives.* The course shall include a review and instruction on the hazards related to explosives. The only exception to this course component is when no explosives are used or stored on mine property.

(12) *Health and safety aspects of the tasks to which the new miner will be assigned.* The course shall include instructions in the health and safety aspects of the tasks to be assigned, the safe work procedures of such tasks, and the mandatory health and safety standards pertinent to such tasks.

(13) Such other courses as may be required by the District Manager based on circumstances and conditions at the mine.

(c) Methods, including oral, written or practical demonstration, to determine successful completion of the training shall be included in the training plan. Upon completion of training, the methods for determining successful completion shall be administered to the miner. The method for determining successful completion of preassignment training under paragraph (a) of this section shall be administered to the miner before he is assigned to work duties.

(d) Upon proof by an operator that a newly employed miner has received the courses and hours of instruction set forth in paragraphs (a) and (b) of this section within 12 months preceding initial employment at a mine, such miner need not repeat the training, but the operator shall give and the miner shall receive and complete the instruction and program of training set forth in paragraph (b) of § 48.26 (Training of newly employed experienced miners) and § 48.27 (New task training of miners), if applicable, before commencing work.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23641, May 28, 1982]

§ 48.26 Training of newly employed experienced miners; minimum courses of instruction.

(a) A newly employed experienced miner shall receive and complete training in the program of instruction prescribed in this section before such miner is assigned to work duties.

(b) The training program for newly employed experienced miners shall include the following:

(1) *Introduction to work environment.* The course shall include a visit and tour of the mine. The methods of mining or operations utilized at the mine shall be observed and explained.

(2) *Mandatory health and safety standards.* The course shall include the mandatory health and safety standards pertinent to the tasks to be assigned.

(3) *Authority and responsibility of supervisors and miners' representatives.* The course shall include a review and description of the line of authority of supervisors and miners' representatives and the responsibilities of such supervisors and miners' representatives; and an introduction to the operator's rules and the procedures for reporting hazards.

(4) *Transportation controls and communication systems.* The course shall include instruction on the procedures in effect for riding on and in mine conveyances; the controls for the transportation of miners and materials; and the use of the mine communication systems, warning signals, and directional signs.

(5) *Escape and emergency evacuation plans; firewarning and firefighting.* The course shall include a review of the mine escape system; escape and emergency evacuation plans in effect at the mine; and instruction in the firewarning signals and firefighting procedures.

(6) *Ground controls; working in areas of highwalls, water hazards, pits, and spoil banks; illumination and night work.* The course shall include, where applicable, an introduction to and instruction on the highwall and ground control plans in effect at the mine; procedures for working safely in areas of highwalls, water hazards, pits, and spoil banks, the illumination of work areas, and safe work procedures for miners during hours of darkness.

(7) *Hazard recognition.* The course shall include the recognition and avoidance of hazards present in the mine, particularly any hazards related to explosives where explosives are used or stored at the mine.

(8) Such other courses as may be required by the District Manager based on circumstances and conditions at the mine.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23641, May 28, 1982]

§ 48.27 Training of miners assigned to a task in which they have had no previous experience; minimum courses of instruction.

(a) Miners assigned to new work tasks as mobile equipment operators, drilling machine operators, haulage and conveyor systems operators, ground control machine operators, and those in blasting operations shall not perform new work tasks in these catergories until training prescribed in this paragraph and paragraph (b) of this section has been completed. This training shall not be required for miners who have been trained and who have demonstrated safe operating procedures for such new work tasks within 12 months preceding assignment. This training shall also not be required for miners who have performed the new work tasks and who have demonstrated safe operating procedures for such new work tasks within 12 months preceding assignment. The training program shall include the following:

(1) *Health and safety aspects and safe operating procedures for work tasks, equipment, or machinery.* The training shall include instruction in the health and safety aspects and safe operating procedures related to the assigned tasks, and shall be given in an on-the-job environment; and,

(2)(i) *Supervised practice during nonproduction.* The training shall include supervised practice in the assigned tasks, and the performance of work duties at times or places where production is not the primary objective; or,

(ii) *Supervised operation during production.* The training shall include, while under direct and immediate supervision and production is in progress, operation of the machine or equipment and the performance of work duties.

(3) *New or modified machines and equipment.* Equipment and machine operators shall be instructed in safe operating procedures applicable to new or modified machines or equipment to be installed or put into operation in the mine, which require new or different operating procedures.

(4) Such other courses as may be required by the District Manager based on circumstances and conditions at the mine.

(b) Miners under paragraph (a) of this section shall not operate the equipment or machine or engage in blasting operations without direction and immediate supervision until such miners have demonstrated safe operating procedures for the equipment or machine or blasting operation to the operator or the operator's agent.

(c) Miners assigned a new task not covered in paragraph (a) of this section shall be instructed in the safety and health aspects and safe work procedures of the task, prior to performing such task.

(d) All training and supervised practice and operation required by this section shall be given by a qualified trainer, or a supervisor experienced in the assigned tasks, or other person experienced in the assigned tasks.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23640, May 28, 1982]

§ 48.28 Annual refresher training of miners; minimum courses of instruction; hours of instruction.

(a) Each miner shall receive a mimimum of 8 hours of annual refresher training as prescribed in this section.

(b) The annual refresher training program for all miners shall include the following courses of instruction:

(1) *Mandatory health and safety standards.* The course shall include mandatory health and safety standard requirements which are related to the miner's tasks.

(2) *Transportation controls and communication systems.* The course shall include instruction on the procedures for riding on and in mine conveyances; the controls in effect for the transportation of miners and materials; and the use of the mine communication systems, warning signals, and directional signs.

(3) *Escape and emergency evacuation plans; firewarning and firefighting.* The course shall include a review of the mine escape system; escape and emergency evacuation plans in effect at the mine; and instruction in the firewarning signals and firefighting procedures.

(4) *Ground control; working in areas of highwalls, water hazards, pits, and spoil banks; illumination and night work.* The course shall include, where applicable, a review and instruction on the highwall and ground control plans in effect at the mine; procedures for working safely in areas of highwalls, water hazards, pits, and spoil banks; the illumination of work areas; and safe work procedures during hours of darkness.

(5) *First aid.* The course shall include a review of first aid methods acceptable to MSHA.

(6) *Electrical hazards.* The course shall include recognition and avoidance of electrical hazards.

(7) *Prevention of accidents.* the course shall include a review of accidents and causes of accidents, and instruction in accident prevention in the work environment.

(8) *Health.* The course shall include instruction on the purpose of taking dust measurements, where applicable, and noise and other health measurements, and any health control plan in effect at the mine shall be explained. The health provisions of the Act and warning labels shall also be explained.

(9) *Explosives.* The course shall include a review and instruction on the hazards related to explosives. The only exception to this course component is when there are no explosives used or stored on the mine property.

(10) *Self-rescue and respiratory devices.* The course shall include instruction and demonstration in the use, care, and maintenance of self-rescue and respiratory devices, where applicable.

(11) Such other courses as may be required by the District Manager based on circumstances and conditions at the mine.

(c) All experienced miners already employed at a mine on the effective date of the Act (March 9, 1978) shall receive refresher training, as prescribed in this section and in accordance with an approved plan, to begin not more than 90 days after the date of approval of the training program required by this Subpart B.

(d) Where annual refresher training is conducted periodically, such sessions shall not be less than 30 minutes of actual instruction time and the miners shall be notified that the session is part of annual refresher training.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23641, May 28, 1982]

§ 48.29 Records of training.

(a) Upon a miner's completion of each MSHA approved training program, the operator shall record and certify on MSHA form 5000-23 that the miner has received the specified training. A copy of the training certificate shall be given to the miner at the completion of the training. The training certificates for each miner shall be available at the mine site for inspection by MSHA and for examination by the miners, the miners' representative and State inspection agencies. When a miner leaves the operator's employ, the miner shall be entitled to a copy of his training certificates.

(b) False certification that training was given shall be punishable under section 110 (a) and (f) of the Act.

(c) Copies of training certificates for currently employed miners shall be kept at the mine site for 2 years, or for 60 days after termination of employment.

OMB Control No. 1219-0070. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 14706, Apr. 6, 1982]

§ 48.30 Compensation for training.

(a) Training shall be conducted during normal working hours; miners attending such training shall receive the rate of pay as provided in § 48.22(d) (Definition of normal working hours) of this Subpart B.

(b) If such training shall be given at a location other than the normal place of work, miners shall be compensated for the additional costs, such a mileage, meals, and lodging, they may incur in attending such training sessions.

§ 48.31 Hazard training.

(a) Operators shall provide to those miners, as defined in § 48.22(a) (2) (Definition of miner) of this Subpart B, a training program before such miners commence their work duties. This training program shall include the following instruction, which is applicable to the duties of such miners:

(1) Hazard recognition and avoidance;

(2) Emergency and evacuation procedures;

(3) Health and safety standards, safety rules and safe working procedures;

(4) Self-rescue and respiratory devices; and,

(5) Such other instruction as may be required by the District Manager based on circumstances and conditions at the mine.

(b) Miners shall receive the instruction required by this section at least once every 12 months.

(c) The training program required by this section shall be submitted with the training plan required by § 48.23(a) (Training plans: Submission and approval) of this Subpart B and shall include a statement on the methods of instruction to be used.

(d) In accordance with § 48.29 (Records of training) of this Subpart B, the operator shall maintain and make available for inspection, certificates that miners have received the instruction required by this section.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23641, May 28, 1982]

§ 48.32 Appeals procedures.

The operator, miner, and miners' representative shall have the right of appeal from a decision of the District Manager.

(a) In the event an operator, miner, or miners' representative decides to appeal a decision by the District Manager, such an appeal shall be submitted, in writing, to the Administrator for Coal Mine Safety and Health or Administrator for Metal and Nonmetal Safety and Health, as appropriate, MSHA, 4015 Wilson Boulevard, Arlington, Va. 22203, within 30 days of notification of the District Manager's decision.

(b) The Administrator may require additional information from the operator, the miners or their representatives, and the District Manager, if the Administrator determines such information is necessary.

(c) The Administrator shall render a decision on the appeal within 30 days after receipt of the appeal.

[43 FR 47459, Oct. 13, 1978, as amended at 47 FR 23641, May 28, 1982]

PART 49—MINE RESCUE TEAMS

Sec.
49.1 Purpose and scope.
49.2 Availability of mine rescue teams.
49.3 Alternative mine rescue capability for small and remote mines.
49.4 Alternative mine rescue capability for special mining conditions.
49.5 Mine rescue station.
49.6 Equipment and maintenance requirements.
49.7 Physical requirements for mine rescue team.
49.8 Training for mine rescue teams.
49.9 Mine emergency notification plan.
49.10 Effective date.

AUTHORITY: Sec. 101, 103(h), 115(e) and 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173, as amended by Pub. L. 95-164, 91 Stat. 1291, 1299, 1317, 83 Stat. 803 (30 U.S.C. 811, 813(h), 825(e), and 957).

SOURCE: 45 FR 47002, July 11, 1980, unless otherwise noted.

§ 49.1 Purpose and scope.

This part implements the provisions of Section 115(e) of the Federal Mine Safety and Health Act of 1977. Every operator of an underground mine shall assure the availability of mine rescue capability for purposes of emergency rescue and recovery.

§ 49.2 Availability of mine rescue teams.

(a) Except where alternative compliance is permitted for small and remote mines (§ 49.3) or those mines operating under special mining conditions (§ 49.4), every operator of an underground mine shall:

(1) Establish at least two mine rescue teams which are available at all times when miners are underground; or

(2) Enter into an arrangement for mine rescue services which assures that at least two mine rescue teams are available at all times when miners are underground.

(b) Each mine rescue team shall consist of five members and one alternate, who are fully qualified, trained, and equipped for providing emergency mine rescue service.

(c) To be considered for membership on a mine rescue team, each person must have been employed in an underground mine for a minimum of one year within the past five years. For the purpose of mine rescue work only, miners who are employed on the surface but work regularly underground shall meet the experience requirement. The underground experience requirement is waived for those miners on a mine rescue team on the effective date of this rule.

(d) Each operator shall arrange, in advance, ground transportation for rescue teams and equipment to the mine or mines served.

(e) Upon the effective date of this part, the required rescue capability shall be present at all existing underground mines, upon initial excavation of a new underground mine entrance, or the re-opening of an existing underground mine.

(f) Except where alternative compliance is permitted under § 49.3 or § 49.4, no mine served by a mine rescue team shall be located more than two hours ground travel time from the mine rescue station with which the rescue team is associated.

(g) As used in this part, mine rescue teams shall be considered available where teams are capable presenting themselves at the mine site(s) within a reasonable time after notification of an occurrence which might require their services. Rescue team members will be considered available even though performing regular work duties or in an off-duty capacity. The requirement that mine rescue teams be available shall not apply when teams are participating in mine rescue contests or providing services to another mine.

(h) Each operator of an underground mine who provides rescue teams under this section shall send the District Manager a statement describing the mine's method of compliance with this part. The statement shall disclose whether the operator has independently provided mine rescue teams or entered into an agreement for the services of mine rescue teams. The name of the provider and the location of the services shall be included in the statement. A copy of the statement shall be posted at the mine for the miners' information. Where a miners' representative has been designated, the operator shall also provide the representative with a copy of the statement.

§ 49.3 Alternative mine rescue capability for small and remote mines.

(a) If an underground mine is small and remote, an operator may provide for an alternative mine rescue capability. For the purposes of this part only, consideration for small and remote shall be given where the total underground employment of the operator's mine and any surrounding mine(s) within two hours ground travel time of the operator's mine is less than 36.

(b) An application for alternative mine rescue capability shall be submitted to the District Manager for the district in which the mine is located for review and approval.

(c) Each application for an alternative mine rescue capability shall contain:

(1) The number of miners employed underground at the mine on each shift;

(2) The distances from the two nearest mine rescue stations;

(3) The total underground employment of mines within two hours ground travel time of the operator's mine;

(4) The operator's mine fire, ground, and roof control history;

(5) The operator's established escape and evacuation plan;

(6) A statement by the operator evaluating the usefulness of additional refuge chambers to supplement those which may exist;

(7) A statement by the operator as to the number of miners willing to serve on a mine rescue team;

(8) The operator's alternative plan for assuring that a suitable mine rescue capability is provided at all times when miners are underground; and

(9) Other relevant information about the operator's mine which may be requested by the District Manager.

(d) A copy of the operator's application shall be posted at the mine. Where a miners' representative has been designated, the operator shall also provide the representative with a copy of the application.

(e) In determining whether to approve an application for alternative compliance, the District Manager shall consider:

(1) The individual circumstances of the small and remote mine;

(2) Comments submitted by, or on behalf of, any affected miner; and

(3) Whether the alternative mine rescue plan provides a suitable rescue capability at the operator's mine.

(f) Where alternative compliance is approved by MSHA, the operator shall adopt the alternative plan and post a copy of the approved plan (with appropriate MSHA mine emergency telephone numbers) at the mine for the miners' information. Where a miners' representative has been designated, the operator shall also provide the representative with a copy of the approved plan.

(g) The operator shall notify the District Manager of any changed condition or factor materially affecting information submitted in the application for alternative mine rescue capability.

(h)(1) An approved plan for alternative mine rescue capability shall be subject to revocation or modification for cause by MSHA, where it is determined that a condition or factor has changed which would materially alter the operator's mine rescue capability. If such action is contemplated, the operator will be notified, and given an opportunity to be heard before the appropriate District Manager.

(2) If an application for alternative compliance is denied or revoked, the District Manager shall provide the reason for such denial or revocation in writing to the operator. The operator may appeal this decision in writing to the Administrator for Coal Mine Safety and Health or the Administrator for Metal and Nonmetal Mine Safety and Health, as appropriate, 4015 Wilson Boulevard, Arlington, Virginia 22203.

§ 49.4 Alternative mine rescue capability for special mining conditions.

(a) If an underground mine is operating under special mining conditions, the operator may provide an alternative mine rescue capability.

(b) An application for alternative mine rescue capability shall be submitted to the District Manager for the district in which the mine is located for review and approval.

(c) To be considered "operating under special mining conditions," the operator must show that all of the following conditions are present:

(1) The mine has multiple adits or entries;

(2) The mined substance is noncombustible and the mining atmosphere nonexplosive;

(3) There are multiple vehicular openings to all active mine areas, sufficient to allow fire and rescue vehicles full access to all parts of the mine in which miners work or travel;

(4) Roadways or other openings are not supported or lined with combustible materials;

(5) The mine shall not have a history of flammable-gas emission or accumulation, and the mined substance shall not have a history associated with flammable or toxic gas problems; and

(6) Any reported gas or oil well or exploratory drill hole shall be plugged to within 100 feet above and below the horizon of the ore body or seam.

(d) Each application shall contain:

(1) An explanation of the special mining conditions;

(2) The number of miners employed underground at the mine on each shift;

(3) The distances from the two nearest mine rescue stations;

(4) The operator's mine fire history;

(5) The operator's established escape and evacuation plan;

(6) The operator's alternative plan for assuring that a suitable mine rescue capability is provided at all times when miners are underground; and

(7) Other relevant information about the operator's mine which may be requested by the District Manager.

(e) A copy of the operator's application shall be posted at the mine. Where a miners' representative has been designated, the operator shall also provide the representative with a copy of the application.

(f) In determining whether to approve an application for alternative compliance, the District Manager shall consider:

(1) The individual circumstances of the mine operating under special mining conditions;

(2) Comments submitted by, or on behalf of, any affected miner; and

(3) Whether the alternative mine rescue plan provides a suitable rescue capability at the operator's mine.

(g) Where alternative compliance is approved by MSHA the operator shall adopt the alternative plan and post a copy of the approved plan (with appropriate MSHA mine emergency telephone numbers) at the mine for the miners' information. Where a miners' representative has been designated, the operator shall also provide the representative with a copy of the alternative plan.

(h) The operator shall notify the District Manager of any changed condition or factor materially affecting information submitted in the application for alternative mine rescue capability.

(i) (1) An approved plan for alternative mine rescue capability shall be subject be to revocation or modification by MSHA, where it is determined that a condition or factor has changed which would materially alter the operator's mine rescue capability. If such action is contemplated, the operator will be notified and given an opportunity to be heard before the appropriate District Manager.

(2) If an application for alternative compliance is denied or revoked, the District Manager shall provide the reason for such denial or revocation in writing to the operator. The operator may appeal this decision in writing to the Administrator for Coal Mine Safety and Health or the Administrator for Metal and Nonmetal Mine Safety and Health, as appropriate, 4015 Wilson Boulevard, Arlington, Virginia 22203.

§ 49.5 Mine rescue station.

(a) Except where alternative compliance is permitted, every operator of an underground mine shall designate, in advance, the location of the mine rescue station serving the mine.

(b) Mine rescue stations are to provide a centralized storage location for rescue equipment. This centralized storage location may be either at the mine site, affiliated mines, or a separate mine rescue structure.

(c) Mine rescue stations shall provide a proper storage environment to assure equipment readiness for immediate use.

(d) Authorized representatives of the Secretary shall have the right of entry to inspect any designated mine rescue station.

§ 49.6 Equipment and maintenance requirements.

(a) Each mine rescue station shall be provided with at least the following equipment:

(1) Twelve self-contained oxygen breathing apparatus, each with a minimum of 2 hours capacity (approved under Subpart H of Part 11 of this title), and any necessary equipment for testing such breathing apparatus;

(2) A portable supply of liquid air, liquid oxygen, pressurized oxygen, oxygen generating or carbon dioxide absorbant chemicals, as applicable to the supplied breathing apparatus and sufficient to sustain each team for six hours while using the breathing apparatus during rescue operations;

(3) One extra oxygen bottle (fully charged) for every six self-contained compressed oxygen breathing apparatus;

(4) One oxygen pump or a cascading system, compatible with the supplied breathing apparatus;

(5) Twelve permissible cap lamps and a charging rack;

(6) Two gas detectors appropriate for each type of gas which may be encountered at the mines served;

(7) Two oxygen indicators or two flame safety lamps;

(8) One portable mine rescue communication system (approved under Part 23 of this title) or a sound-powered communication system. The wires or cable to the communication system shall be of sufficient tensile strength to be used as a manual communication system. These communication systems shall be at least 1,000 feet in length; and

(9) Necessary spare parts and tools for repairing the breathing apparatus and communication system.

(b) Mine rescue apparatus and equipment shall be maintained in a manner which will assure readiness for immediate use. A person trained in the use and care of breathing apparatus shall inspect and test the apparatus at intervals not exceeding 30 days. A record of inspections and tests shall be maintained at the mine rescue station for a period of one year.

§ 49.7 Physical requirements for mine rescue team.

(a) Each member of a mine rescue team shall be examined annually by a physician who shall certify that each person is physically fit to perform mine rescue and recovery work for prolonged periods under strenuous conditions. The first such physical examination shall be completed within 60 days prior to scheduled initial training. A team member requiring corrective eyeglasses will not be disqualified provided the eyeglasses can be worn securely within an approved facepiece.

(b) In determining whether a miner is physically capable of performing mine rescue duties, the physician shall take the following conditions into consideration:

(1) Seizure disorder;

(2) Perforated eardrum;

(3) Hearing loss without a hearing aid greater than 40 decibels at 400, 1,000 and 2,000 Hz;

(4) Repeated blood pressure (controlled or uncontrolled by medication) reading which exceeds 160 systolic, or 100 diastolic, or which is less than 105 systolic, or 60 diastolic;

(5) Distant visual acuity (without glasses) less than 20/50 Snellen scale in one eye, and 20/70 in the other;

(6) Heart disease;

(7) Hernia;

(8) Absence of a limb or hand; or

(9) Any other condition which the examining physician determines is relevant to the question of whether the miner is fit for rescue team service;

(c) The operator shall have MSHA Form 5000-3 certifying medical fitness completed and signed by the examining physician for each member of a mine rescue team. These forms shall be kept on file at the mine rescue station for a period of one year.

§ 49.8 Training for mine rescue teams.

(a) Prior to serving on a mine rescue team each member shall complete, at a minimum, an initial 20-hour course of instruction as prescribed by MSHA's Office of Educational Policy and Development, in the use, care, and maintenance of the type of breathing apparatus which will be used by the mine rescue team. The initial training requirement is waived for those miners on a mine rescue team on the effective date of this rule.

(b) Upon completion of the initial training, all team members shall receive at least 40 hours of refresher training annually. This training shall be given at least 4 hours each month, or for a period of 8 hours every two months. This training shall include:

(1) Sessions underground at least once each 6 months;

(2) The wearing and use of the breathing apparatus by team members for a period of at least two hours while under oxygen every two months;

(3) Where applicable, the use, care, capabilities, and limitations of auxiliary mine rescue equipment, or a different breathing apparatus;

(4) Advanced mine rescue training and procedures, as prescribed by MSHA's Office of Educational Policy and Development; and

(5) Mine map training and ventilation procedures.

(c) A mine rescue team member will be ineligible to serve on a team if more than 8 hours of training is missed during one year, unless additional training is received to make up for the time missed.

(d) The training courses required by this section shall be conducted by instructors who have been employed in an underground mine for a minimum of one year within the past five years, and who have received MSHA approval through:

(1) Completion of an MSHA or State approved instructor's training course and the program of instruction in the subject matter to be taught.

(2) Designation by the District Manager as approved instructors to teach specific courses, based on their qualifications and teaching experience. Previously approved instructors need not be re-designated to teach the approved courses as long as they have taught those courses within the 24 months prior to the effective date of this part. Where individuals are designated, the District Manager may waive the underground experience requirement.

(e) The District Manager may revoke an instructor's approval for good cause. A written statement revoking the approval together with reasons for revocation shall be provided the instructor. The affected instructor may appeal the decision of the District Manager by writing to the Administrator for Coal Safety and Health or Administrator for a Metal and Non-Metal Safety and Health, as appropriate, MSHA, 4015 Wilson Boulevard, Arlington, Virginia 22203. The Administrator shall issue a decision on the appeal.

(f) Upon request from the District Manager, the operator shall provide information concerning the schedule of upcoming training.

(g) A record of training of each team member shall be on file at the mine rescue station for a period of one year.

[45 FR 47002, July 11, 1980, as amended at 47 FR 23641, May 28, 1982; 47 FR 28095, June 29, 1982]

§ 49.9 Mine emergency notification plan.

(a) Each underground mine shall have a mine rescue notification plan outlining the procedures to follow in notifying the mine rescue teams when there is an emergency that requires their services.

(b) A copy of the mine rescue notification plan shall be posted at the mine for the miners' information. Where a miners' representative has been designated, the operator shall also provide the representative with a copy of the plan.

§ 49.10 Effective date.

All provisions and requirements of this part shall become effective on July 11, 1981.

SUBCHAPTERS I-L—[RESERVED]

SUBCHAPTER M—ACCIDENTS, INJURIES, ILLNESSES, EMPLOYMENT, AND PRODUCTION IN MINES

PART 50—NOTIFICATION, INVESTIGATION, REPORTS AND RECORDS OF ACCIDENTS, INJURIES, ILLNESSES, EMPLOYMENT, AND COAL PRODUCTION IN MINES

Subpart A—General

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50.2 Definitions.

Subpart B—Notification, Investigation, Preservation of Evidence

50.10 Immediate notification.
50.11 Investigation.
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Subpart C—Reporting of Accidents, Injuries, and Illnesses

50.20 Preparation and submission of MSHA Report Form 7000-1—Mine Accident, Injury, and Illness Report.
50.20-1 General instructions for completing MSHA Form 7000-1.
50.20-2 Criteria—"Transfer to another job".
50.20-3 Criteria—Differences between medical treatment and first aid.
50.20-4 Criteria—MSHA Form 7000-1, Section A.
50.20-5 Criteria—MSHA Form 7000-1, Section B.
50.20-6 Criteria—MSHA Form 7000-1, Section C.
50.20-7 Criteria—MSHA Form 7000-1, Section D.

Subpart D—Quarterly Employment and Coal Production Report

50.30 Preparation and submission of MSHA Form 7000-2—Quarterly Employment and Coal Production Report.
50.30-1 General instructions for completing MSHA Form 7000-2.

Subpart E—Maintenance of Records; Verification of Information

50.40 Maintenance of records.
50.41 Verification of reports.

AUTHORITY: Secs. 103(e), 111, and 508 of the Federal Coal Mine Health and Safety Act of 1969, 30 U.S.C. secs. 813(e), 821, and 957; and secs. 4 and 13 of the Federal Metal and Non-Metallic Mine Safety Act, 30 U.S.C. secs. 723, 732; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803, unless otherwise noted.

SOURCE: 42 FR 65535, Dec. 30, 1977, unless otherwise noted.

NOTE: Nomenclature changes to this part appear at 43 FR 12318, Mar. 24, 1978.

Subpart A—General

§ 50.1 Purpose and scope.

This Part 50 implements §§ 103(e) and 111 of the Federal Coal Mine Health and Safety Act of 1969, 30 U.S.C. 801 et seq., and §§ 4 and 13 of the Federal Metal and Nonmetallic Mine Safety Act, 30 U.S.C. 721 et seq., and applies to operators of coal, metal, and nonmetallic mines. It requires operators to immediately notify the Mine Safety and Health Administration (MSHA) of accidents, requires operators to investigate accidents, and restricts disturbance of accident related areas. This part also requires operators to file reports pertaining to accidents, occupational injuries and occupational illnesses, as well as employment and coal production data, with MSHA, and requires operators to maintain copies of reports at relevant mine offices. The purpose of this part is to implement MSHA's authority to investigate, and to obtain and utilize information pertaining to, accidents, injuries, and illnesses occurring or originating in mines. In utilizing information received under Part 50, MSHA will develop rates of injury occurrence (incident rates or IR), on the basis of 200,000 hours of employee exposure (equivalent to 100 employees working 2,000 hours per year). The incidence rate for a particular injury category will be based on the formula:

$$IR = \frac{\text{no. of cases x } 200{,}000}{\text{hours of employee exposure}}$$

MSHA will develop data respecting injury severity using days away from work or days of restricted work activity and the 200,000 hour base as criteria. The severity measure (SM) for a particular injury category will be based on the formula:

$$SM = \frac{\text{sum of days x } 200{,}000}{\text{hours of employee exposure}}$$

[42 FR 65535, Dec. 30, 1977; 43 FR 1617, Jan. 11, 1978, as amended at 43 FR 12318, Mar. 24, 1978]

§ 50.2 Definitions.

As used in this part:

(a) "Mine" means: (1) an area of land from which minerals are extracted in nonliquid form or, if in liquid form, are extracted with workers underground (2) private ways and roads appurtenant to such area, and (3) lands, excavations, underground passageways, shafts, slopes, tunnels and workings, structures, facilities, equipment, machines, tools, or other property including impoundments, retention dams, and tailings ponds, on the surface or underground, used in, or to be used in, or resulting from, the work of extracting such minerals from their natural deposits in nonliquid form, or if in liquid form, with workers underground, or used in, or to be used in, the milling of such minerals, or the work of preparing coal or other minerals, and includes custom coal preparation facilities.

(b) "Work of preparing the coal" means the breaking, crushing, sizing, cleaning, washing, drying, mixing, storing, and loading of bituminous coal, lignite, or anthracite, and such other work of preparing such coal as is usually done by the operator of the coal mine.

(c) "Operator" means

(1) Any owner, lessee, or other person who operates, controls, or supervises a coal mine; or,

(2) The person, partnership, association, or corporation, or subsidiary of a corporation operating a metal or nonmetal mine, and owning the right to do so, and includes any agent thereof charged with responsibility for the operation of such mine.

(d) "Miner" means any individual working in a mine.

(e) "Occupational injury" means any injury to a miner which occurs at a mine for which medical treatment is administered, or which results in death or loss of consciousness, inability to perform all job duties on any day after an injury, temporary assignment to other duties, or transfer to another job.

(f) "Occupational illness" means an illness or disease of a miner which may have resulted from work at a mine or for which an award of compensation is made.

(g) "First aid" means one-time treatment, and any follow-up visit for observational purposes, of a minor injury.

(h) "Accident" means,

(1) A death of an individual at a mine;

(2) An injury to an individual at a mine which has a reasonable potential to cause death;

(3) An entrapment of an individual for more than thirty minutes;

(4) An unplanned inundation of a mine by a liquid or gas;

(5) An unplanned ignition or explosion of gas or dust;

(6) An unplanned mine fire not extinguished within 30 minutes of discovery;

(7) An unplanned ignition or explosion of a blasting agent or an explosive;

(8) An unplanned roof fall at or above the anchorage zone in active workings where roof bolts are in use; or, an unplanned roof or rib fall in active workings that impairs ventilation or impedes passage;

(9) A coal or rock outburst that causes withdrawal of miners or which disrupts regular mining activity for more than one hour;

(10) An unstable condition at an impoundment, refuse pile, or culm bank which requires emergency action in order to prevent failure, or which causes individuals to evacuate an area; or, failure of an impoundment, refuse pile, or culm bank;

(11) Damage to hoisting equipment in a shaft or slope which endangers an individual or which interferes with use of the equipment for more than thirty minutes; and

(12) An event at a mine which causes death or bodily injury to an individual not at the mine at the time the event occurs.

[42 FR 65535, Dec. 30, 1977; 43 FR 1617, Jan. 11, 1978, as amended at 43 FR 12318, Mar. 24, 1978]

Subpart B—Notification, Investigation, Preservation of Evidence

§ 50.10 Immediate notification.

If an accident occurs, an operator shall immediately contact the MSHA District or Subdistrict Office having jurisdiction over its mine. If an operator cannot contact the appropriate MSHA District or Subdistrict Office it shall immediately contact the MSHA Headquarters Office in Washington, D.C., by telephone, toll free at (202) 783-5582.

[42 FR 65535, Dec. 30, 1977, as amended at 43 FR 12318, Mar. 24, 1978]

§ 50.11 Investigation.

(a) After notification of an accident by an operator, the MSHA District or Subdistrict Manager will promptly decide whether to conduct an accident investigation and will promptly inform the operator of his decision. If MSHA decides to investigate an accident, it will initiate the investigation within 24 hours of notification.

(b) Each operator of a mine shall investigate each accident and each occupational injury at the mine. Each operator of a mine shall develop a report of each investigation. No operator may use Form 7000-1 as a report, except that an operator of a mine at which fewer than twenty miners are employed may, with respect to that mine, use Form 7000-1 as an investigation report respecting an occupational injury not related to an accident. No operator may use an investigation or an investigation report conducted or prepared by MSHA to comply with this paragraph. An operator shall submit a copy of any investigation report to MSHA at its request. Each report prepared by the operator shall include,

(1) The date and hour of occurrence;

(2) The date the investigation began;

(3) The names of individuals participating in the investigation;

(4) A description of the site;

(5) An explanation of the accident or injury, including a description of any equipment involved and relevant events before and after the occurrence, and any explanation of the cause of any injury, the cause of any accident or cause of any other event which caused an injury;

(6) The name, occupation, and experience of any miner involved;

(7) A sketch, where pertinent, including dimensions depicting the occurrence;

(8) A description of steps taken to prevent a similar ocurrence in the future; and

(9) Identification of any report submitted under § 50.20 of this part.

§ 50.12 Preservation of evidence.

Unless granted permission by a MSHA District Manager or Subdistrict Manager, no operator may alter an accident site or an accident related area until completion of all investigations pertaining to the accident except to the extent necessary to rescue or recover an individual, prevent or eliminate an imminent danger, or prevent destruction of mining equipment.

[42 FR 65535, Dec. 30, 1977; 43 FR 1617, Jan. 11, 1978]

Subpart C—Reporting of Accidents, Injuries, and Illnesses

§ 50.20 Preparation and submission of MSHA Report Form 7000-1—Mine Accident, Injury, and Illness Report.

(a) Each operator shall maintain at the mine office a supply of MSHA Mine Accident, Injury, and Illness Report Form 7000-1. These may be obtained from MSHA Metal and Nonmetallic Mine Health and Safety Subdistrict Offices and from MSHA Coal Mine Health and Safety Subdistrict Offices. Each operator shall report each accident, occupational injury, or occupational illness at the mine. The principal officer in charge of health and safety at the mine or the supervisor of the mine area in which an accident or occupational injury occurs, or an occupational illness may have originated, shall complete or review the form in accordance with the instructions and criteria in §§ 50.20-1 through 50.20-7. If an occupational illness is diagnosed as being one of those listed in § 50.20-6(b)(7), the operator must report it under this part. The operator shall mail completed forms to MSHA within ten working days after an accident or occupational injury occurs or an occupational illness is diagnosed. When an accident specified in § 50.10 occurs, which does not involve an occupational injury, sections A, B, and items 5 through 11 of section C of Form 7000-1 shall be completed and mailed to MSHA in accordance with the instructions in § 50.20-1 and criteria contained in §§ 50.20-4 through 50.20-6.

(b) Each operator shall report each occupational injury or occupational illness on one set of forms. If more than one miner is injured in the same accident or is affected simultaneously with the same occupational illness, an operator shall complete a separate set of forms for each miner affected. To the extent that the form is not self-explanatory, an operator shall complete the form in accordance with the instructions in § 50.20-1 and criteria contained in §§ 50.20-2 through 50.20-7.

(Secs. 103 (a) and (h), and 508, Pub. L. 91-173, as amended by Pub. L. 95-164, 91 Stat. 1297, 1299, 83 Stat. 803 (30 U.S.C. 801, 813, 957))

[42 FR 65535, Dec. 30, 1977, as amended at 44 FR 52828, Sept. 11, 1979]

§ 50.20-1 General instructions for completing MSHA Form 7000-1.

Each Form 7000-1 consists of four sheets, an original and three copies. The original form shall be mailed to: MSHA—Health and Safety Analysis Center, P.O. Box 25367, Denver Federal Center, Denver, Colo. 80225, within ten working days after an accident, occupational injury or occupational illness. At the same time, the first copy shall be mailed to the appropriate local MSHA Mine Health and Safety District or Subdistrict office. If the first copy does not contain a completed Section D—Return to Duty Information—the second copy shall be retained by the operator until the miner returns to work or a final disposition is made respecting the miner. When the miner returns to work or a final disposition is made, the operator shall, within five days, complete Section D and mail the second copy to MSHA—Health and Safety Analysis Center (HSAC). A third copy, containing all the information in the first and second copies shall be retained at the mine office closest to the mine for a period of five years.

[42 FR 65535, Dec. 30, 1977; 43 FR 1617, Jan. 11, 1978]

§ 50.20-2 Criteria—"Transfer to another job."

"Transfer to another job" means transfers, either temporary, or permanent, which are occasioned by a work-related injury or illness. Permanent or temporary transfers to remove miners from further exposure to health hazards are considered preventative in nature and are not required to be reported. Controlling the amount of exposure to radiation during some period of time is one example. Transfer of a coal miner to a less dusty area of a mine when the miner elects to exercise rights under Section 203(b) of the Federal Coal Mine Health and Safety Act of 1969 is another example.

§ 50.20-3 Criteria—Differences between medical treatment and first aid.

(a) Medical treatment includes, but is not limited to the suturing of any wound, treatment of fractures, application of a cast or other professional means of immobilizing an injured part of the body, treatment of infection arising out of an injury, treatment of bruise by the drainage of blood, surgical removal of dead or damaged skin (debridement), amputation or permanent loss of use of any part of the body, treatment of second and third degree burns. Procedures which are diagnostic in nature are not considered by themselves to constitute medical treatments. Visits to a physician, physical examinations, X-ray examinations, and hospitalization for observations, where no evidence of injury or illness is found and no medical treatment given, do not in themselves constitute medical treatment. Procedures which are preventive in nature also are not considered by themselves to constitute medical treatment. Tetanus and flu shots are considered preventative in nature. First aid includes any one-time treatment, and follow-up visit for the purpose of observation, of minor injuries such as, cuts, scratches, first degree burns and splinters. Ointments, salves, antiseptics, and dressings to minor injuries are considered to be first aid.

(1) *Abrasion.* (i) First aid treatment is limited to cleaning a wound, soaking, applying antiseptic and nonprescription medication and bandages on the first visit and follow-up visits limited to observation including changing dressing and bandages. Additional cleaning and application of antiseptic constitutes first aid where it is required by work duties that soil the bandage.

(ii) Medical treatment includes examination for removal of imbedded foreign material, multiple soakings, whirlpool treatment, treatment of infection, or other professional treatments and any treatment involving more than a minor spot-type injury. Treatment of abrasions occurring to greater than full skin depth is considered medical treatment.

(2) *Bruises.* (i) First aid treatment is limited to a single soaking or application of cold compresses, and follow-up visits if they are limited only to observation.

(ii) Medical treatment includes multiple soakings, draining of collected blood, or other treatment beyond observation.

(3) *Burns, Thermal and Chemical (resulting in destruction of tissue by direct contact).* (i) First aid treatment is limited to cleaning or flushing the surface, soaking, applying cold compresses, antiseptics or nonprescription medications, and bandaging on the first visit, and follow-up visits restricted to observation, changing bandages, or additional cleaning. Most first degree burns are amenable to first aid treatment.

(ii) Medical treatment includes a series of treatments including soaks, whirlpool, skin grafts, and surgical debridement (cutting away dead skin). Most second and third degree burns require medical treatment.

(4) *Cuts and Lacerations.* (i) First aid treatment is the same as for abrasions except the application of butterfly closures for cosmetic purposes only can be considered first aid.

(ii) Medical treatment includes the application of butterfly closures for non-cosmetic purposes, sutures, (stitches), surgical debridement, treatment of infection, or other professional treatment.

(5) *Eye Injuries.* (i) First aid treatment is limited to irrigation, removal of foreign material not imbedded in eye, and application of nonprescription medications. A precautionary visit (special examination) to a physician is considered as first aid if treatment is limited to above items, and follow-up visits if they are limited to observation only.

(ii) Medical treatment cases involve removal of imbedded foreign objects, use of prescription medications, or other professional treatment.

(6) *Inhalation of Toxic or Corrosive Gases.* (i) First aid treatment is limited to removal of the miner to fresh air or the one-time administration of oxygen for several minutes.

(ii) Medical treatment consists of any professional treatment beyond that mentioned under first aid and all cases involving loss of consciousness.

(7) *Foreign Objects.* (i) First aid treatment is limited to cleaning the wound, removal of any foreign object by tweezers or other simple techniques, application of antiseptics and nonprescription medications,and bandaging on the first visit. Follow-up visits are limited to observation including changing of bandages. Additional cleaning and applications of antiseptic constitute first aid where it is required by work duties that soil the bandage.

(ii) Medical treatment consists of removal of any foreign object by physician due to depth of imbedment, size or shape of object, or location of wound. Treatment for infection, treatment of a reaction to tetanus booster, or other professional treatment, is considered medical treatment.

(8) *Sprains and Strains.* (i) First aid treatment is limited to soaking, application of cold compresses, and use of elastic bandages on the first visit. Follow-up visits for observation, including reapplying bandage, are first aid.

(ii) Medical treatment includes a series of hot and cold soaks, use of whirlpools, diathermy treatment, or other professional treatment.

[42 FR 65535, Dec. 30, 1977; 43 FR 12318, Mar. 24, 1978]

§ 50.20-4 Criteria—MSHA Form 7000-1, Section A.

(a) *MSHA I.D. number.* Enter the seven digit number assigned to the mine operation by MSHA. If the number is unknown, the nearest MSHA Health and Safety District or Subdistrict office should be contacted.

(b) *Mine name.* Enter the exact name of the operation to which the MSHA I.D. number was assigned.

(c) *Company name.* Enter the name of the mining company submitting this report or, if not a company, the operator's name.

§ 50.20-5 Criteria—MSHA Form 7000-1, Section B.

(a) This section shall be completed for all accidents immediately reported to MSHA as defined in §50.10. Circle the code from the following list which best defines the accident:

Code 01—A death of an individual at a mine;

Code 02—An injury to an individual at a mine which has a reasonable potential to cause death;

Code 03—An entrapment of an individual for more than 30 minutes;

Code 04—An unplanned mine inundation by a liquid or gas;

Code 05—An unplanned ignition or explosion of dust or gas;

Code 06—An unplanned mine fire not extinguished within 30 minutes of discovery;

Code 07—An unplanned ignition of a blasting agent or an explosive;

Code 08—An unplanned roof fall at or above the anchorage zone in active workings where roof bolts are in use; or a roof or rib fall on active workings that impairs ventilation or impedes passage;

Code 09—A coal or rock outburst that causes withdrawal of miners or which disrupts regular mining activity for more than one hour;

Code 10—An unstable condition at an impoundment, refuse pile, or culm bank which requires emergency action in order to prevent failure, or which causes individuals to evacuate an area; or, failure of an impoundment, refuse pile, or culm bank;

Code 11—Damage to hoisting equipment in a shaft or slope which endangers an individual or which interferes with use of the equipment for more than thirty minutes; and

Code 12—An event at a mine which causes death or bodily injury to an individual not at the mine at the time the event occurs.

§ 50.20-6 Criteria—MSHA Form 7000-1, Section C.

(a) Complete items 5 through 12 for each accident, occupational injury, or occupational illness.

(1) Item 5. Location and mining method. Circle the appropriate location code that was nearest to the location of the accident injury or illness. If the accident injury or illness occurred at the surface, circle only the surface location code in column (a). If the accident injury or illness occurred underground, circle only the underground location code in column (b). Where applicable, circle the underground mining method code in column (c). Applicable codes for columns (a), (b), and (c) are as follows:

(i) Column (a)—Surface location codes. If the accident injury or illness occurred at the surface of a mine, circle one of the following codes which best describes where the accident injury or illness occurred and ignore columns (b) and (c):

Code 02—Surface shop, yard, etc., at an underground mine;

Code 30—Mill operation, preparation plant, or breaker, including associated shops and yards;

Code 03—Surface strip or open pit mine, including shop and yard;

Code 04—Surface auger coal operation on a coal mine, including shop and yard;

Code 05—Surface culm bank or refuse pile at a coal mine, including shop and yard;

Code 06—Dredge mining, including shop and yard;

Code 12—Other surface mining;

Code 17—Independent shops;

Code 99—Office facilities.

(ii) Column (b)—Underground location codes. If the accident injury or illness occurred underground, circle the one code which best describes where the accident injury or illness occurred:

Code 01—Vertical shaft;
Code 02—Slope/Inclined shaft;
Code 03—Face;
Code 04—Intersection;
Code 05—Underground Shop/Office;
Code 06—Other.

(ii) Column (c)—Underground mining method. If the underground accident injury or illness occurred on a working section or working place, enter the code for the mining method at that working section or working place:

Code 01—Longwall;
Code 02—Shortwall;
Code 03—Conventional/stoping;
Code 05—Continuous Miners;
Code 06—Hand Loading;
Code 07—Caving;
Code 08—Other.

(2) Item 6. Date of accident injury or illness. Enter the date the accident injury or illness occurred.

(3) Item 9. Describe fully the conditions contributing to the accident injury or illness and quantify the damage or impairment. Describe what happened and the reasons therefor, identify the factors which led or contributed to the accident, injury or illness and identify any damage or impairment to the mining operation. The narrative shall clearly specify the actual cause or causes of the accident injury or illness and shall include the following:

(i) Whether the accident injury or illness involved any aspect of compliance with rules and regulations;

(ii) Whether the accident injury or illness involved mine equipment or the mining system;

(iii) Whether the accident injury or illness involved job skills and miner proficiency, training and attitude; and

(iv) Whether the accident injury or illness involved protective items relating to clothing, or protective devices on equipment.

(4) Item 10. If equipment was involved in the accident, injury or illness specify type (loader, shuttle car, dozer, etc.), name of manufacturer, and equipment model number.

(5) Item 11. Name of witness to accident injury or illness. If any miner witnessed the accident injury or illness, enter the name.

(b) Complete items 13-27 for each occupational injury, or occupational illness.

(1) Item 13. Name of injured/ill miner. Enter the miner's name (first, middle initial, and last).

(2) Item 17. Regular job title. Enter the miner's regular job title. For example: "shuttle car operator".

(3) Item 19. Check if this injury/illness resulted in permanent total or partial disability.

(i) "Permanent total disability." The classification for any injury or illness other than death which permanently and totally incapacitates an employee from following any gainful occupation or which results in the loss, or the complete loss of use, of any of the following in one accident injury or illness:

(A) Both eyes;

(B) One eye and one hand, or arm, or leg, or foot;

(C) Any two of the following not on the same limb: hand, arm, foot, or leg.

(ii) "Permanent partial disability." The classification for any injury or illness other than death or permanent total disability which results in the loss, or complete loss of use, of any member or part of a member of the body, or any permanent impairment of functions of the body or part thereof, regardless of any preexisting disability of the affected member or impaired body function.

(4) Item 20. What directly inflicted injury or illness. Name the object or substance which directly affected the miner. For example: the machine or thing struck against or which struck the miner; the vapor or poison inhaled or swallowed; the chemical or non-ionizing radiation which irritated the skin; or in cases of strains or hernias, the thing lifted or pulled.

(5) Item 21. Nature of injury or illness. For injuries, use commonly used medical terms to answer this question such as puncture wound, third degree burn, fracture, dislocation, amputation. For multiple injuries, enter the injury which was the most serious. For illness, name the illness, such as pneumoconiosis, silicosis. Avoid general terms such as "hurt", "sore", "sick".

(6) Item 22. Part of body injured or affected. Name the part of the body with the most serious injury. For example, if an injured employee has a bruised finger and a broken ankle, write "ankle". If amputation, enter part of the body lost.

(7) Item 23. Occupational Illness. Circle the code from the list below which most accurately describes the illness. These are typical examples and are not to be considered the complete listing of the types of illnesses and disorders that should be included under each category. In cases where the time of onset of illness is in doubt, the day of diagnosis of illness will be considered as the first day of illness.

(i) Code 21—*Occupational Skin Diseases or Disorders.* Examples: Contact dermatitis, eczema, or rash caused by primary irritants and sensitizers or poisonous plants; oil acne; chrome ulcers; chemical burns or inflammations.

(ii) Code 22—*Dust Disease of the Lungs (Pneumoconioses).* Examples: Silicosis, asbestosis, coal worker's pneumoconiosis, and other pneumoconioses.

(iii) Code 23—*Respiratory Conditions due to Toxic Agents.* Examples: Pneumonitis, pharyngitis, rhinitis, or acute congestion due to chemicals, dusts, gases, or fumes.

(iv) Code 24—*Poisoning (Systemic Effects of Toxic Materials).* Examples: Poisoning by lead, mercury, cadmium, arsenic, or other metals, poisoning by carbon monoxide, hydrogen sulfide or other gases; poisoning by benzol, carbon tetrachloride, or other organic solvents; poisoning by insecticide sprays such as parathion, lead arsenate; poisoning by other chemicals such as formaldehyde, plastics and resins.

(v) Code 25—*Disorders Due to Physical Agents (Other than Toxic Materials).* Examples: Heatstroke, sunstroke, heat exhaustion and other effects of environmental heat; freezing, frostbite and effects of exposure to low temperatures; caisson disease; effects of ionizing radiation (radon daughters, non-medical, non-therapeutic X-rays, radium); effects of nonionizing radiation (welding flash, ulta-violet rays, micro-waves, sunburn).

(vi) Code 26—*Disorders Associated with Repeated Trauma.* Examples: Noise-induced hearing loss; synovitis, tenosynovitis, and bursitis; Raynaud's phenomena; and other conditions due to repeated motion, vibration or pressure.

(vii) Code 29—*All Other Occupational Illnesses.* Examples: Infectious hepatitis, malignant and benign tumors, any form of cancer, kidney diseases, food poisoning, histoplasmosis.

(8) Item 24. Miner's work activity when injury or illness occurred. Describe exactly the activity of the injured miner when the occupational injury or occupational illness occurred. For example: "Setting temporary support prior to drilling holes for roof bolts."

(Secs. 103 (a) and (h), and 508, Pub. L. 91-173, as amended by Pub. L. 95-164, 91 Stat. 1297, 1299, 83 Stat. 803 (30 U. S. C. 801, 813, 957))2

[42 FR 65535, Dec. 30, 1977; 43 FR 1617, Jan. 11, 1978, as amended at 44 FR 52828, Sept. 11, 1979]

§ 50.20-7 Criteria—MSHA Form 7000-1, Section D.

This section requires information concerning the miner's return to duty.

(a) Item 28. Permanently transferred or terminated. Check this block if the miner's employment was terminated or if the miner was permanently transferred to another regular job as a direct result of the occupational injury or occupational illness.

(b) Item 29. Show the date that the injured person returned to his regular job at full capacity (not to restricted work activity) or was transferred or terminated.

(c) Item 30. Number of days away from work. Enter the number of workdays, consecutive or not, on which the miner would have worked but could not because of occupational injury or occupational illness. The number of days away from work shall not include the day of injury or onset of illness or any days on which the miner would not have worked even though able to work. If an employee loses a day from work solely because of the unavailability of professional medical personnel for initial observation or treatment and not as a direct consequence of the injury or illness, the day should not be counted as a day away from work.

(d) Item 31. Number of days of restricted work activity. Enter the number of workdays, consecutive or not, on which because of occupational injury or occupational illness:

(1) The miner was assigned to another job on a temporary basis;

(2) The miner worked at a permanent job less than full time; or

(3) The miner worked at a permanently assigned job but could not perform all duties normally connected with it. The number of days of restricted work activity shall not include the day of injury or onset of illness, or any days the miner did not work even though able to work.

If an injured or ill employee receives scheduled follow-up medical treatment or observation which results in the loss of a full workday solely because of the unavailability of professional medical personnel, it will not be counted as a day of restricted work activity. Days of restricted work activity end as the result of any of the following:

(i) The miner returns to his regularly scheduled job and performs all of its duties for a full day or shift;

(ii) The miner is permanently transferred to another permanent job (which shall be reported under Item 28, Permanently Transferred or Terminated). If this happens, even though the miner could not perform this original job any longer, the Days of Restricted Work Activity will stop; or

(iii) The miner is terminated or leaves the mine. (Termination shall also be reported under Item 28, Permanently Transferred or Terminated).

Subpart D—Quarterly Employment and Coal Production Report

§ 50.30 Preparation and submission of MSHA Form 7000-2—Quarterly Employment and Coal Production Report.

(a) Each operator of a mine in which an individual worked during any day of a calendar quarter shall complete a MSHA Form 7000-2 in accordance with the instructions and criteria in § 50.30-1 and submit the original to the MSHA Health and Safety Analysis Center, P.O. Box 25367, Denver Federal Center, Denver, Colo. 80225, within 15 days after the end of each calendar quarter. These forms may be obtained from MSHA Metal and Nonmetallic Mine Health and Safety Subdistrict Offices and from MSHA Coal Mine Health and Safety Subdistrict Offices. Each operator shall retain an operator's copy at the mine office nearest the mine for 5 years after the submission date.

(b) Each operator of a coal mine in which an individual worked during any day of a calendar quarter shall report coal production on Form 7000-2.

§ 50.30-1 General instructions for completing MSHA Form 7000-2.

(a) *MSHA I.D. Number* is the 7-digit number assigned to the mine operation by MSHA. Any questions regarding the appropriate I.D. number to use should be directed to your local MSHA Health and Safety District or Subdistrict Office.

(b) *Calendar Quarter:* First quarter is January, February, and March. Second quarter is April, May, and June. Third quarter is July, August, and September. Fourth quarter is October, November, and December.

(c) *County* is the name of the county, borough, or independent city in which the operation is located.

(d) *Operation Name* is the specific name of the mine or plant to which the MSHA I.D. number was assigned and for which the quarterly employment report is being submitted.

(e) *Company Name* is the name of the operating company that this report pertains to.

(f) *Mailing Address* is the address of the mine office where the quarterly employment report is to be retained. This should be as near the operation as possible.

(g) *Employment, Employee Hours, and Coal Production*—(1) *Operation Sub-Unit:* (i) Underground Mine: Report data for your underground workers on the first line. If you have personnel working at the surface of your underground mine, report data for those persons on the second line;

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(ii) Surface Mine (Including Shops and Yards): Report on the appropriate line, employment and coal production for the mining operation. For surface mining sub-units 03, 04, 05 and 06, include all work associated with shops and yards;

(iii) Mill Operations, Preparation Plants, Breakers: Report data on all persons employed at your milling (crushing, sizing, grinding, concentrating, etc.) operation, preparation plant, or breaker, including those working in associated shops and yards. (Do not include personnel reported in shops and yards associated with other sub-units.);

(iv) Office: Include in this category employees who work principally at the mine or preparation facility office.

(2) *Average number of persons working during quarter:* Show the average number of employees on the payroll during all active periods in the quarter. Include all classes of employees (supervisory, professional, technical proprietors, owners, operators, partners, and service personnel) on your payroll, full or part-time, Report Each Employee Under One Activity Only. For example: If one or more persons work both in the mine and the mill, report these employees under the activity where they spend most of their time. If necessary, estimate for the major activity. The average number may be computed by adding together the number of employees working during each pay period and then dividing by the number of pay periods. Do not include pay periods where no one worked. For example, during the quarter you had 5 pay periods where employees worked. The number of employees in each pay period was 10, 12, 13, 14 and 15 respectively. To compute the average, add the number of employees working each pay period (10+12+13+14+15=64). Then divide by the number of pay periods (64 divided by 5=12.8). Rounding this to the nearest whole number, we get 13 as the average number of persons working.

(3) *Total employee-hours worked during the quarter:* Show the total hours worked by all employees during the quarter covered. Include all time where the employee was actually on duty, but exclude vacation, holiday, sick leave, and all other off-duty time, even though paid for. Make certain that each overtime hour is reported as one hour, and not as the overtime pay multiple for an hour of work. The hours reported should be obtained from payroll or other time records. If actual hours are not available, they may be estimated on the basis of scheduled hours. Make certain not to include hours paid but not worked.

(4) *Production of clean coal (short tons):* This section is to be compiled only by operators of underground or surface mines, but not by operators of central or independent coal preparation plants or operators of metal or nonmetal mines. Enter the total production of clean coal from the mine. This must include coal shipped from the mine and coal used for fuel at the mine, but exclude refuse and coal produced at another mine and purchased for use at the mine.

(h) *Other Reportable Data.* Indicate the number of reportable injuries or illnesses occurring at your operation during the quarter covered by this report. Show the name, title, and telephone number of the person to be contacted regarding this report, and show the date that this report was completed.

Subpart E—Maintenance of Records; Verification of Information

§ 50.40 Maintenance of records.

(a) Each operator of a mine shall maintain a copy of each investigation report required to be prepared under § 50.11 at the mine office closest to the mine for five years after the concurrence.

(b) Each operator shall maintain a copy of each report submitted under § 50.20 or § 50.30 at the mine office closest to the mine for five years after submission. Upon request by the Mine Safety and Health Administration, an operator shall make a copy of any report submitted under § 50.20 or § 50.30 available to MSHA for inspection or copying.

[42 FR 65535, Dec. 30, 1977, as amended at 43 FR 12318, Mar. 24, 1978]

§ 50.41 Verification of reports.

Upon request by MSHA, an operator shall allow MSHA to inspect and copy information related to an accident, injury or illnesses which MSHA considers relevant and necessary to verify a report of investigation required by § 50.11 of this part or relevant and necessary to a determination of compliance with the reporting requirements of this part.

SUBCHAPTER N—METAL AND NONMETAL MINE SAFETY AND HEALTH

PART 55—SAFETY AND HEALTH STANDARDS—METAL AND NONMETAL OPEN PIT MINES

Sec.

55.1 Purpose and scope.
55.2 Definitions.
55.3 Ground control.
55.4 Fire prevention and control.
55.5 Air quality and physical agents.
55.6 Explosives.
55.7 Drilling.
55.8 Rotary jet piercing.
55.9 Loading, hauling, dumping.
55.10 Aerial tramways.
55.11 Travelways.
55.12 Electricity.
55.13 Compressed air and boilers.
55.14 Use of equipment.
55.15 Personal protection.
55.16 Materials storage and handling.
55.17 Illumination.
55.18 Safety programs.
55.19 Man hoisting.
55.20 Miscellaneous.
55.22 Savings provision. [Reserved]
55.26 Procedures.

AUTHORITY: Secs. 301(a), 301(b)(2), 301(c)(3) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317-1319 (30 U.S.C. 961(a), (b)(2), (c)(3) (Supp. I, 1977)), and 29 U.S.C. 557a (Supp. I, 1977); sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173, 83 Stat. 803 (30 U.S.C. 957 (1976 ed.)); sec. 6 of the Federal Metal and Nonmetallic Mine Safety Act (repealed 1977), Pub. L. 89-577, 80 Stat. 774 (30 U.S.C. 725 (1976 ed.)), (repealed sec. 306(a), Pub. L. 95-164, 91 Stat. 1322, but see sec. 301(b)(1), Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961(b)(1) (Supp. I, 1977)), Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.), unless otherwise noted.

SOURCE: 34 FR 12504, July 31, 1969, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12318, Mar. 24, 1978.

OMB CONTROL No. 1219-0013 and 1219-0029. (47 FR 14706, Apr. 6, 1982)

§ 55.1 Purpose and scope.

The regulations in this part are promulgated pursuant to section 6 of the Federal Metal and Nonmetallic Mine Safety Act (30 U.S.C. 725) and prescribe health and safety standards for the purpose of the protection of life, the promotion of health and safety, and the prevention of accidents in open pit metal and nonmetallic mines which are subject to that Act. Each standard which is preceded by the word "Mandatory" is a mandatory standard. The violation of a mandatory standard will subject an operator to an order or notice under section 8 of the Act (30 U.S.C. 727).

§ 55.2 Definitions.

As used in this part:

"American Table of Distances" means the current edition of "The American Table of Distances for Storage of Explosives" published by the Institute of Makers of Explosives.

"Approved" means tested and accepted for a specific purpose by a nationally recognized agency.

"Authorized person" means a person approved or assigned by mine management to perform a specific type of duty or duties or to be at a specific location or locations in the mine.

"Barricaded" means obstructed to prevent the passage of persons, vehicles, or flying materials.

"Berm" means a pile or mound of material capable of restraining a vehicle.

"Blasting agent" means any substance classified as a blasting agent by the Department of Transportation in 49 CFR § 173.114a (44 FR 31182, May 31, 1979). This document is available for inspection at each Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration, and may be obtained from the U.S. Government Printing Office, Washington, D.C. 20402.

"Blasting area" means the area near blasting operations in which concussion or flying material can reasonably be expected to cause injury.

"Blasting cap" means a detonator which is initiated by a safety fuse.

"Blasting circuit" means the electrical circuit used to fire one or more electric blasting caps.

"Blasting switch" means a switch used to connect a power source to a blasting circuit.

"Booster" means any unit of explosive or blasting agent used for the purpose of perpetuating or intensifying an initial detonation.

"Capped fuse" means a length of safety fuse to which a blasting cap has been attached.

"Capped primer" means a package or cartridge of explosives which is specifically designed to transmit detonation to other explosives and which contains a detonator.

"Circuit breaker" means a device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent setting without injury to itself when properly applied within its rating.

"Combustible" means capable of being ignited and consumed by fire.

"Company official" means a member of the company supervisory or technical staff.

"Competent person" means a person having abilities and experience that fully qualify him to perform the duty to which he is assigned.

"Conductor" means a material, usually in the form of wire, cable, or bus bar, capable of carrying an electric current.

"Delay connector" means a non-electric short interval delay device for use in delaying blasts which are initiated by detonating cord.

"Detonating cord" means a flexible cord containing a solid core of high explosives.

"Detonator" means any device containing a detonating charge that is used to initiate an explosive and includes but is not limited to blasting caps, electric blasting caps and nonelectric instantaneous or delay blasting caps.

"Distribution box" means a portable apparatus with an enclosure through which an electric circuit is carried to one or more cables from a single incoming feed line, each cable circuit being connected through individual overcurrent protective devices.

"Electric blasting cap" means a detonator designed for and capable of being initiated by means of an electric current.

"Electrical grounding" means to connect with the ground to make the earth part of the circuit.

"Employee" means a person who works for wages or salary in the service of an employer.

"Employer" means a person or organization which hires one or more persons to work for wages or salary.

"Explosive" means any substance classified as an explosive by the Department of Transportation in 49 CFR 173.53, 173.88 and 173.100. Title 49 CFR is available for inspection at each Metal and Nonmetal Safety and Health Subdistrict Office of the Mine Safety and Health Administration, and may be obtained from the U.S. Government Printing Office, Washington, D.C. 20402.

"Face or bank" means that part of any mine where excavating is progressing or was last done.

"Flammable" means capable of being easily ignited and of burning rapidly.

"Flash point" means the minimum temperature at which sufficient vapor is released by a liquid or solid to form a flammable vapor-air mixture at atmospheric pressure.

"Highway" means any public street, public alley, or public road.

"High potential" means more than 650 volts.

"Hoist" means a power driven windlass or drum used for raising ore, rock, or other material from a mine, and for lowering or raising men and material.

"Igniter cord" means a fuse, cordlike in appearance, which burns progressively along its length with an external flame at the zone of burning, and is used for lighting a series of safety fuses in the desired sequence.

"Insulated" means separated from other conducting surfaces by a dielectric substance permanently offering a high resistance to the passage of current and to disruptive discharge through the substance. When any substance is said to be insulated, it is understood to be insulated in a manner suitable for the conditions to which it is subjected. Otherwise, it is, within the purpose of this definition, uninsulated. Insulating covering is one means for making the conductor insulated.

"Insulation" means a dielectric substance offering a high resistance to the passage of current and to a disruptive discharge through the substance.

"Lay" means the distance parallel to the axis of the rope in which a strand makes one complete turn about the axis of the rope.

"Low potential" means 650 volts or less.

"Magazine" means a facility for the storage of explosives, blasting agents, or detonators.

"Major electrical installation" means an assemblage of stationary electrical equipment for the generation, transmission, distribution, or conversion of electrical power.

"Man trip" means a trip on which men are transported to and from a work area.

"Mill" includes any ore mill, sampling works, concentrator, and any crushing, grinding, or screening plant used at, and in connection with, an excavation or mine.

"Misfire" means the complete or partial failure of a blasting charge to explode as planned.

"Multipurpose dry-chemical fire extinguisher" means a listed or approved multipurpose dry-chemical fire extinguisher having a minimum rating of 2-A:10-B:C, by Underwriters Laboratories, Inc., and containing a minimum of 4.5 pounds of dry-chemical agent.

"Non-electric delay blasting cap" means a detonator with an integral delay element and capable of being initiated by miniaturized detonating cord.

"Overburden" means material of any nature, consolidated or unconsolidated, that overlies a deposit of useful materials or ores that are to be mined.

"Overload" means that current which will cause an excessive or dangerous temperature in the conductor or conductor insulation.

"Permissible" means a machine, material, apparatus, or device which has been investigated, tested, and approved by the Bureau of Mines or the Mine Safety and Health Administration and is maintained in permissible condition.

"Potable water" means water which shall meet the applicable minimum health requirements for drinking water established by the State or community in which the mine is located or by the Environmental Protection Agency in 40 CFR Part 141, pages 169-182 revised as of July 1, 1977. Where no such requirements are applicable, the drinking water provided shall conform with the Public Health Service Drinking Water Standards, 42 CFR Part 72, Subpart J, pages 527-533, revised as of October 1, 1976. Publications to which references are made in this definition are hereby made a part hereof. These incorporated publications are available for inspection at each Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration.

"Powder chest" means a substantial, nonconductive portable container equipped with a lid and used at blasting sites for explosives other than blasting agents.

"Primer" means a unit, package, or cartridge of explosives used to initiate other explosives or blasting agents, and which contains a detonator.

"Reverse-current protection" means a method or device used on direct-current circuits or equipment to prevent the flow of current in the reverse direction.

"Roll protection" means a framework, safety canopy or similar protection for the operator when equipment overturns.

"Safety can" means an approved container, of not more than 5 gallons capacity, having a spring-closing lid and spout cover.

"Safety fuse" means a flexible cord containing an internal burning medium by which fire is conveyed at a continuous and uniform rate for the purpose of firing blasting caps or a black powder charge.

"Safety switch" means a sectionalizing switch that also provides shunt protection in blasting circuits between the blasting switch and the shot area.

"Scaling" means removal of insecure material from a face or highwall.

"Secondary safety connection" means a second connection between a conveyance and rope, intended to prevent the conveyance from running away or falling in the event the primary connection fails.

"Shaft" means a vertical or inclined shaft, a slope, incline, or winze.

"Short circuit" means an abnormal connection of relatively low resistance, whether made accidentally or intentionally, between two points of different potential in a circuit.

"Slurry" (as applied to blasting). See "Water gel".

"Stray current" means that portion of a total electric current that flows through paths other than the intended circuit.

"Substantial construction" means construction of such strength, material, and workmanship that the object will withstand all reasonable shock, wear, and usage, to which it will be subjected.

"Suitable" means that which fits, and has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstances.

"Travelway" means a passage, walk or way regularly used and designated for persons to go from one place to another.

"Trip light" means a light displayed on the opposite end of a train from the locomotive or engine.

"Water gel" or "Slurry" (as applied to blasting) means an explosive or blasting agent containing substantial portions of water.

"Wet drilling" means the continuous application of water through the central hole of hollow drill steel to the bottom of the drill hole.

"Working place" means any place in or about a mine where work is being performed.

[34 FR 12504, July 31, 1969, as amended at 35 FR 3661, Feb. 25, 1970; 37 FR 14368, July 19, 1972; 42 FR 29418, June 8, 1977; 42 FR 57039, Oct. 31, 1977; 43 FR 54066, Nov. 17, 1978; 44 FR 31916, June 1, 1979; 44 FR 48541, Aug. 17, 1979]

§ 55.3 Ground control.

55.3-1 *Mandatory.* Standards for the safe control of pit walls, including the overall slope of the pit wall, shall be established and followed by the operator. Such standards shall be consistent with prudent engineering design, the nature of the ground and the kind of material and mineral mined, and the ensuring of safe working conditions according to the degree of slope. Mining methods shall be selected which will ensure wall and bank stability, including benching as necessary to obtain a safe overall slope.

55.3-2 *Mandatory.* Loose, unconsolidated material shall be stripped for a safe distance, but in no case less than 10 feet, from the top of pit or quarry walls, and the loose, unconsolidated material shall be sloped to the angle of repose.

55.3-3 *Mandatory.* To ensure safe operation, the width and height of benches shall be governed by the type of equipment to be used and the operation to be performed.

55.3-4 *Mandatory.* Safe means for scaling pit banks shall be provided. Hazardous banks shall be scaled before other work is performed in the hazardous bank area.

55.3-5 *Mandatory.* Men shall not work near or under dangerous banks. Overhanging banks shall be taken down immediately and other unsafe ground conditions shall be corrected promptly, or the areas shall be barricaded and posted.

55.3-6 *Mandatory.* Men shall approach from above loose rock and areas to be scaled and shall scale from a safe location.

55.3-7 [Reserved]

55.3-8 *Mandatory.* The supervisor, or a competent person designated by him, shall examine working areas and faces for unsafe conditions at least at the beginning of each shift and after blasting. Any unsafe condition found shall be corrected before any further work is performed at the immediate area or face at which the unsafe condition exists.

55.3-9 *Mandatory.* Men shall examine their working places before starting work and frequently thereafter, and any unsafe condition shall be corrected.

55.3-10 and 55.3-11 [Reserved]

55.3-12 *Mandatory.* Men shall not work between equipment and the pit wall or bank where the equipment may hinder escape from falls or slides of the bank.

55.3-13 through 55.3-49 [Reserved]

55.3-50 *Mandatory.* Material, other than hanging material, to be broken by secondary drilling and blasting, or by any other method shall be positioned or blocked to prevent hazardous movement before persons commence breaking operations. Persons who perform those operations shall work from a location where, if movement of material occurs, those persons will not be endangered.

55.3-51 *Mandatory.* Where manual scaling may be required at a work place, a scaling bar of sufficient length to place the user out of danger of falling material shall be provided. The scaling bar shall be blunt on the end held by the user. Picks or other short tools shall not be used for scaling when their use places the user in danger of falling material.

55.3-52 [Reserved]

55.3-53 *Mandatory.* When rock bolts are used as a means of ground support, anchorage test procedures shall be established and tests, shall be conducted to determine the anchorage capacity of rock-bolt installations. Test results shall be in writing and made available to the Secretary or his duly authorized representative.

55.3-54 *Mandatory.* Rock bolts used as a means of ground support and which require torquing shall be torqued to a value within the range determined from information obtained by tests in the strata in which the rock-bolt assembly is used. In no case shall the applied torque cause a bolt tension that would exceed the yield point or anchorage capacity of the rock-bolt assembly being used.

55.3-55 *Mandatory.* When installing point-anchor rock bolts:

(a) A torque test shall be conducted on at least every fourth installed bolt.

(b) Torque testing shall be conducted immediately after bolt installation.

(c) If the recommended torque has not been achieved, the equipment used to install the bolt shall be adjusted and the next bolt installed shall then be tested.

(d) If the recommended torque has not been achieved on the majority of bolts installed in a working place through equipment adjustment, supplemental support equivalent to longer roof bolts with adequate anchorage, steel or wood sets, or cribs shall be installed.

55.3-56 *Mandatory.* Rock bolt hole drill bits shall be easily identifiable by sight or feel and diameters shall be within a tolerance of ±0.030-inches of the manufacturer's recommended hole diameter for the anchor used.

55.3-57 *Mandatory.* If used in rock-bolt assemblies to reduce friction between the bolt head and the bearing plate, washers shall: (a) Have hardness in the range of 35-45 HRC (Hardness Rockwell C Scale). (b) Conform to the shape of the bolt head and bearing plate. (c) Have sufficient strength to withstand loads up to the yield point of the rock bolt.

OMB CONTROL NO. 1219-0035, paragraph 55.3-53. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12504, July 31, 1969, as amended at 35 FR 3661, Feb. 25, 1970; 35 FR 18588, Dec. 8, 1970; 42 FR 29419, June 8, 1977; 42 FR 57039, Oct. 31, 1977; 44 FR 48514, Aug. 17, 1979; 47 FR 14706, Apr. 6, 1982]

§ 55.4 Fire prevention and control.

55.4-1 *Mandatory.* No person shall smoke or use an open flame—

(a) Where flammable solvents, liquids, fluids, or other flammable materials are stored, transported, handled, or used; or

(b) Where oil or grease is stored, transported, handled, or used, if smoking or the use of an open flame may cause a fire; or

(c) Within an unsafe distance of any area where smoking or the use of an open flame may cause a fire or an explosion.

55.4-2 *Mandatory.* Signs warning against smoking and open flames shall be posted so they can be readily seen in areas or places where fire or explosion hazards exist.

55.4-3 *Mandatory.* Areas surrounding electric substations and unburied tanks used for the storage of flammable or combustible liquids shall be free of combustible materials (including dry vegetation) for a distance of at least 25 feet.

55.4-4 *Mandatory.* Flammable liquids shall be stored in accordance with standards of the National Fire Protection Association or other recognized agencies approved by the Mine Safety and Health Administration. Small quantities of flammable liquids drawn from storage shall be kept in appropriately labeled safety cans.

55.4-5 *Mandatory.* Effective February 13, 1980, fixed unburied tanks used for the storage of flammable or combustible liquids shall be securely mounted on firm foundations. Where necessary to prevent leaks caused by tanks settling, piping shall be provided with flexible connections or other special fittings.

55.4-6 [Reserved]

55.4-7 *Mandatory.* Means shall be provided to remove or control spilled flammable or combustible liquids.

55.4-8 *Mandatory.* Fuel lines shall be equipped with valves to cut off fuel at the source and shall be located and maintained to minimize fire hazards.

55.4-9 *Mandatory.* All heat sources, including lighting equipment, capable of producing combustion shall be insulated or isolated from combustible materials.

55.4-10 *Mandatory.* Power wires and cables shall be adequately insulated where they pass through doors or walls or where they present a fire hazard.

55.4-11 *Mandatory.* Abandoned electrical circuits shall be deenergized and isolated so that they cannot become energized inadvertently.

55.4-12 *Mandatory.* All flammable and combustible waste materials, grease, lubricants or flammable liquids shall not be allowed to accumulate where they can create a fire hazard.

55.4-13 *Mandatory.* In areas where materials such as oily waste or oily rags create a fire hazard, the materials shall be placed in covered metal containers until disposed of properly.

55.4-14 *Mandatory.* Solvents with flash points lower than 100° F. (38° C.) shall not be used for cleaning.

55.4-15 *Mandatory.* Solvents shall not be used near an open flame or other ignition source, or near any source of heat, or in an atmosphere that can elevate the temperature of the solvent above the flash point.

55.4-16 *Mandatory.* Drip pans shall be provided to catch leakage or spillage whenever combustible or flammable liquids are dispensed in a place or manner which may create a fire hazard. Floor areas where drip pans are used shall be cleaned immediately after spills.

55.4-17 [Reserved]

55.4-18 *Mandatory.* Oxygen cylinders shall not be stored in rooms or areas used or designated for oil or grease storage.

55.4-19 *Mandatory.* Gages and regulators used with oxygen or acetylene cylinders shall be kept clean and free of oil and grease.

55.4-20 *Mandatory.* Battery-charging stations shall be located in well-ventilated areas.

55.4-21 *Mandatory.* Equipment powered by internal combustion engines (except diesel engines), where the fuel tank is an integral part of the equipment, shall be shut off and stopped before being fueled.

55.4-22 *Mandatory.* Each mine shall have available or be provided with suitable fire-fighting equipment adequate for the size of the mine.

55.4-23 *Mandatory.* Fire fighting equipment which is provided on the mine property shall be strategically located, readily accessible, plainly marked, properly maintained, and inspected periodically. Records shall be kept of such inspections.

55.4-24 *Mandatory.* Fire extinguishers and fire suppression devices shall be:

(a) Of the appropriate type for the particular fire hazard involved.

(b) Adequate in number and size for the particular fire hazard involved.

(c) Replaced with a fully charged extinguisher or device, or recharged immediately, after any discharge is made from the extinguisher or device.

(d) Inspected, tested, and maintained at regular intervals according to the manufacturer's recommendations.

(e) Approved by the Underwriter's Laboratories, Inc., or other competent testing agency acceptable to the Mine Safety and Health Administration.

55.4-25 *Mandatory.* Effective February 13, 1980, whenever fire hydrants are used, they shall be provided with—

(a) Uniform fittings;

(b) Readily available wrenches or keys to open the valves; and

(c) Readily available adapters that connect hydrant fittings to the hose equipment of local fire departments.

55.4-26 *Mandatory.* Water pipes, valves, outlets, hydrants, and hoses designated for fire fighting purposes shall be inspected every 90 days and tested annually.

55.4-27 *Mandatory.* Whenever self-propelled mobile equipment is used, such equipment shall be provided with a suitable fire extinguisher readily accessible to the equipment operator.

55.4-28 *Mandatory.* Welding, cutting, arc welding or soldering shall be performed by a competent person.

55.4-29 *Mandatory.* When welding or cutting, suitable precautions shall be taken to insure that smoldering metal or sparks do not result in a fire. Fire extinguishing equipment shall be immediately available at the site.

55.4-30 through 55.4-32 [Reserved]

55.4-33 *Mandatory.* Valves on oxygen and acetylene tanks shall be kept closed when the contents are not being used.

55.4-34 [Reserved]

55.4-35 *Mandatory.* Before any heat is applied to pipelines or containers which have contained flammable or combustible substances, they shall be drained, ventilated, thoroughly cleaned of residual substances and filled with either an inert gas or, where compatible, filled with water.

55.4-36 through 55.4-39 [Reserved]

55.4-39A *Mandatory.* Effective February 13, 1980, storage buildings or rooms in which flammable or combustible liquids or other flammable materials are stored and which are within 100 feet of where miners normally work shall be well-ventilated and constructed of materials having a fire-resistance rating of no less than one (1) hour as tested under the appropriate National Fire Protection Association (NFPA) fire-resistance test or under a test of another approved testing agency.

55.4-39B *Mandatory.* Emergency fire fighting plans in combination with evacuation and rescue plans shall be established and coordinated with available fire fighting organizations. Emergency fire fighting drills shall be held for each shift at least once every six (6) months.

55.4-39C through 55.4-39Z [Reserved]

55.4-40 *Mandatory.* Fire alarm systems shall be provided and maintained in operating condition or adequate fire alarm procedures shall be established to warn promptly all persons endangered by a fire.

55.4-41 *Mandatory.* Every building or structure where persons normally work shall be provided with exits sufficient to permit the prompt escape of persons in case of fire.

55.4-42 through 55.4-46 [Reserved]

55.4-47 *Mandatory.* Belt conveyors shall be equipped with a safety switch capable of automatically stopping the drive pulley in the event of excessive slippage of the belt.

where ignition of the belt could create a hazard to personnel. When it is necessary to operate the conveyor while temporarily bypassing the safety switch or any automatic function of the switch, a person shall attend the belt at the drive pulley.

55.4-48 *Mandatory.* All employees shall be instructed at least once each calendar year on fire alarm signals and applicable procedures to be followed in case of fire or other emergency. Records of instruction shall be kept for two years.

55.4-49 [Reserved]

OMB CONTROL No. 1219-0062, paragraph 55.4-48. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12504, July 31, 1969, as amended at 35 FR 3661, Feb. 25, 1970; 35 FR 18588, Dec. 8, 1970; 37 FR 14369, July 19, 1972; 38 FR 23380, Aug. 29, 1973; 41 FR 23612, June 10, 1976; 44 FR 48515, Aug. 17, 1979; 47 FR 14706, Apr. 6, 1982]

§ 55.5 Air quality and physical agents.

AIR QUALITY

55.5-1 *Mandatory.* Except as permitted by § 55.5-5:

(a) Except as provided in paragraph (b), the exposure to airborne contaminants shall not exceed, on the basis of a time weighted average, the threshold limit values adopted by the American Conference of Governmental Industrial Hygienists, as set forth and explained in the 1973 edition of the Conference's publication, entitled "TLV's Threshold Limit Values for Chemical Substances in Workroom Air Adopted by ACGIH for 1973," pages 1 through 54, which are hereby incorporated by reference and made a part hereof. This publication may be obtained from the American Conference of Governmental Industrial Hygienists by writing to the Secretary-Treasurer, P.O. Box 1937, Cincinnati, Ohio 45201, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration. Excursions above the listed thresholds shall not be of a greater magnitude than is characterized as permissible by the Conference.

(b) The 8-hour time-weighted average airborne concentration of asbestos dust to which employees are exposed shall not exceed 2 fibers per milliliter greater than 5 microns in length, as determined by the membrane filter method at 400- 450 magnification (4 millimeter objective) phase contrast illumination. No employees shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers longer than 5 micrometers, per milliliter of air, as determined by the membrane filter method over a minimum sampling time of 15 minutes. "Asbestos" is a generic term for a number of hydrated silicates that, when crushed or processed, separate into flexible fibers made up of fibrils. Although there are many asbestos minerals, the term "asbestos" as used herein is limited to the following minerals: chrysotile, amosite, crocidolite, anthophylite asbestos, tremolite asbestos, and actinolite asbestos.

(c) Employees shall be withdrawn from areas where there is present an airborne contaminant given a "C" designation by the Conference and the concentration exceeds the threshold limit value listed for that contaminant.

55.5-2 *Mandatory.* Dust, gas, mist, and fume surveys shall be conducted as frequently as necessary to determine the adequacy of control measures.

55.5-3 *Mandatory.* Holes shall be collared and drilled wet, or other efficient dust control measures shall be used when drilling non-water-soluble material. Efficient dust control measures shall be used when drilling water-soluble materials.

55.5-4 [Reserved]

55.5-5 *Mandatory.* Control of employee exposure to harmful airborne contaminants shall be, insofar as feasible, by prevention of contamination, removal by exhaust ventilation, or by dilution with uncontaminated air. However, where accepted engineering control measures have not been developed or when necessary by the nature of work involved (for example, while establishing controls or occasional entry into hazardous atmospheres to perform maintenance or investigation), employees may work for reasonable periods of time in concentrations of airborne contaminants exceeding permissible levels if they are protected by appropriate respiratory protective equipment. Whenever respiratory protective equipment is used a program for selection, maintenance, training, fitting, supervision, cleaning, and use shall meet the following minimum requirements:

(a) Mine Safety and Health Administration approved respirators which are applicable and suitable for the purpose intended shall be furnished, and employees shall use the protective equipment in accordance with training and instruction.

(b) A respirator program consistent with the requirements of ANSI Z88.2-1969, published by the American National Standards Institute and entitled "American National Standards Practices for Respiratory Protection ANSI Z88.2-1969," approved August 11, 1969, which is hereby incorporated by reference and made a part hereof. This publication may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration.

(c) When respiratory protection is used in atmospheres immediately harmful to life, the presence of at least one other person with backup equipment and rescue capability shall be required in the event of failure of the respiratory equipment.

55.5-6 *Mandatory.* The following chemical substances shall not be used or stored except by competent persons under laboratory conditions approved by a nationally recognized agency acceptable to the Secretary.

(a) Carbon tetrachloride,
(b) Phenol,
(c) 4-Nitrobiphenyl,
(d) Alpha-naphthylamine,
(e) 4,4-Methylene Bis (2-chloroaniline),
(f) Methyl-chloromethyl ether,
(g) 3,3 Dichlorobenzidine,
(h) Bis (chloromethyl) ether,
(i) Beta-napthylamine,
(j) Benzidine,
(k) 4-Aminodiphenyl,
(l) Ethyleneimine,
(m) Beta-propiolactone,
(n) 2-Acetylaminofluorene,
(o) 4-Dimethylaminobenzene, and
(p) N-Nitrosodimethylamine.

55.5-7 through 55.5-9 [Reserved]

55.5-10 *Mandatory.* Silica sand, or other materials containing more than 1 percent free silica, shall not be used as an abrasive substance in abrasive blasting cleaning operations without requiring full-flow respiratory protection, or equivalent, to all exposed persons.

55.5-11 through 55.5-49 [Reserved]

PHYSICAL AGENTS

55.5-50 *Mandatory.* (a) No employee shall be permitted an exposure to noise in excess of that specified in the table below. Noise level measurements shall be made using a sound level meter meeting specifications for type 2 meters contained in American National Standards Institute (ANSI) Standard S1.4-1971, "General Purpose Sound Level Meters," approved April 27, 1971, which is hereby incorporated by reference and made a part hereof, or by a dosimeter with similar accuracy. This publication may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration.

PERMISSIBLE NOISE EXPOSURES

Duration per day, hours of exposure	Sound level, dBA, slow response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

No exposure shall exceed 115 dBA. Impact or impulsive noises shall not exceed 140 dB, peak sound pressure level.

NOTE: When the daily noise exposure is composed of two or more periods of noise exposure at different levels, their combined effect shall be considered rather than the individual effect of each.
If the sum

$$(C_1/T_1)+(C_2/T_2)+\ .\ .\ .\ (C_n/T_n)$$

exceeds unity, then the mixed exposure shall be considered to exceed the permissible exposure. C_n indicates the total time of exposure at a specified noise level, and T_n indicates the total time of exposure permitted at that level. Interpolation between tabulated values may be determined by the following formula:

$$\log T=6.322-0.0602\ SL$$

Where T is the time in hours and SL is the sound level in dBA.

(b) When employees' exposure exceeds that listed in the above table, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce exposure to within permissible levels, personal protection equipment shall be provided and used to reduce sound levels to within the levels of the table.

OMB CONTROL No. 1291-0048, paragraph 55.5-5. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12504, July 31, 1969, as amended at 35 FR 3661, Feb. 25, 1970; 35 FR 18588, Dec. 8, 1970; 39 FR 24316, July 1, 1974; 39 FR 28433, Aug. 7, 1974; 41 FR 23612, June 10, 1976; 43 FR 54066, Nov. 17, 1978; 44 FR 36385, June 22, 1979; 44 FR 48515, Aug. 17, 1979; 47 FR 14706, Apr. 6, 1982]

§ 55.6 Explosives.

The term "explosives" as used in this § 55.6 includes blasting agents. The standards in this section in which the term "explosives" appears are applicable to blasting agents (as well as to other explosives) unless blasting agents are expressly excluded.

STORAGE

55.6-1 *Mandatory.* Detonators and explosives other than blasting agents shall be stored in magazines.

55.6-2 *Mandatory.* Detonators shall not be stored in the same magazine with explosives.

55.6-3 and 55.6-4 [Reserved]

55.6-5 *Mandatory.* Areas surrounding magazines and facilities for the storage of blasting agents shall be kept clear of rubbish, brush, dry grass, or trees (other than live trees 10 or more feet tall), for a distance not less than 25 feet in all directions, and other unnecessary combustible materials for a distance of not less than 50 feet.

55.6-6 [Reserved]

55.6-7 *Mandatory.* Explosives, detonators, and related materials such as safety fuse and detonating cord shall be:

(a) Stored in a manner to facilitate use of oldest stocks first.

(b) Stored according to brand and grade in such a manner as to facilitate identification.

(c) Stored with their top sides up.

(d) Stacked in a stable manner but not more than eight (8) feet high.

55.6-8 *Mandatory.* Ammonium nitrate-fuel oil blasting agents shall be physically separated from other explosives, safety fuse, or detonating cord stored in the same magazine and in such a manner that oil does not contaminate the other explosives, safety fuse, or detonating cord.

55.6-9 and 55.6-10 [Reserved]

55.6-11 *Mandatory.* Containers of explosives, blasting agents, and detonators shall be closed while being stored.

55.6-12 *Mandatory.* Prior to interior repair of facilities for storage of explosives, including blasting agents, all materials stored within the facility shall be removed and the interior cleaned. Prior to the exterior repair of such facilities, all materials stored within the facility shall be removed if there exists a possibility that such repairs may produce a spark or flame. The explosives removed from storage facilities to be repaired shall be placed either in other storage facilities appropriate for the storage of such materials under this section or a safe distance from the facilities under repair where they shall be properly guarded and protected until the repairs have been completed and the materials have been returned to storage within the facilities.

55.6-13 through 55.6-19 [Reserved]

55.6-20 *Mandatory.* Magazines shall be:

(a) Located in accordance with the current American Table of Distances for storage of explosives.

(b) Detached structures located away from powerlines, fuel storage areas, and other possible sources of fire.

(c) Constructed substantially of noncombustible material or covered with fire-resistant material.

(d) Reasonably bullet resistant.

(e) Electrically bonded and grounded if constructed of metal.

(f) Made of nonsparking materials on the inside, including floors.

(g) Provided with adequate and effectively screened ventilation openings near the floor and ceiling.

(h) Kept locked securely when unattended.

(i) Posted with suitable danger signs so located that a bullet passing through the face of a sign will not strike the magazine.

(j) Used exclusively for storage of explosives or detonators and kept free of all extraneous materials.

(k) Kept clean and dry in the interior, and in good repair.

(l) Unheated, unless heated in a manner that does not create a fire or explosion hazard. Electrical heating devices shall not be used inside a magazine.

55.6-21 through 55.6-39 [Reserved]

TRANSPORTATION

55.6-40 *Mandatory.* Explosives and detonators shall be transported in separate vehicles unless separated by 4 inches of hardwood or the equivalent.

55.6-41 *Mandatory.* When explosives and detonators are hauled by trolley locomotive, covered, electrically-insulated cars shall be used.

55.6-42 *Mandatory.* Self-propelled vehicles used to transport explosives or detonators shall be equipped with suitable fire extinguishers.

55.6-43 *Mandatory.* Vehicles containing explosives or detonators shall be posted with proper warning signs.

55.6-44 *Mandatory.* When vehicles containing explosives or detonators are parked, the brakes shall be set, the motive power shut off, and the vehicle shall be blocked securely against rolling.

55.6-45 *Mandatory.* Vehicles containing explosives or detonators shall not be taken to a repair garage or shop for any purpose.

55.6-46 *Mandatory.* Vehicles containing explosives or detonators shall be maintained in good condition and shall be operated at a safe speed and in accordance with all safe operating practices.

55.6-47 *Mandatory.* Vehicles used to transport explosives, other than blasting agents, shall have substantially constructed bodies, no sparking metal exposed in the cargo space, and shall be equipped with suitable sides and tail gates; explosives shall not be piled higher than the side or end enclosures.

55.6-48 *Mandatory.* Explosives and blasting agents shall be transported without undue delay, and over routes and at times that expose a minimum number of persons.

55.6-49 [Reserved]

55.6-50 *Mandatory.* Other materials or supplies shall not be placed on or in the cargo space of a conveyance containing explosives, detonating cord or detonators, except for safety fuse and except for properly secured nonsparking equipment used expressly in the handling of such explosives, detonating cord or detonators.

55.6-51 *Mandatory.* Explosives or detonators shall not be transported on locomotives.

55.6-52 [Reserved]

55.6-53 *Mandatory.* Only the necessary attendants shall ride on or in vehicles containing explosives or detonators.

55.6-54 *Mandatory.* Explosives or detonators shall not be transported on man trips.

55.6-55 [Reserved]

55.6-56 *Mandatory.* Substantial nonconductive containers shall be used to carry explosives to blasting sites.

55.6-57 through 55.6-64 [Reserved]

55.6-65 *Mandatory.* Vehicles containing detonators or explosives, other than blasting agents, shall not be left unattended except in blasting areas where loading or charging is in progress.

55.6-66 through 55.89 [Reserved]

Use

55.6-90 *Mandatory.* Persons who use or handle explosives or detonators shall be experienced men who understand the hazards involved; trainees shall do such work only under the supervision of and in the immediate presence of experienced men.

55.6-91 *Mandatory.* Blasting operations shall be under the direct control of authorized persons.

55.6-92 *Mandatory.* Damaged or deteriorated explosives and blasting agents shall be destroyed in a safe manner under the instructions of the explosives or blasting agent manufacturer or its designated agent.

55.6-93 *Mandatory.* Boreholes shall be cleared of obstructions before charging.

55.6-94 *Mandatory.* Holes to be blasted shall be charged as near to blasting time as practical and such holes shall be blasted as soon as possible after charging has been completed. In no case shall the time elapsing between the completion of charging to the time of blasting exceed 72 hours unless prior approval has been obtained from the Mine Safety and Health Administration.

55.6-95 [Reserved]

55.6-96 *Mandatory.* Explosives shall be kept separated from detonators until charging is started.

55.6-97 *Mandatory.* Primers shall be made up only at the time of use and as close to the blasting area as conditions allow.

55.6-98 *Mandatory.*

(a) Primers containing a detonator shall be prepared with the detonator contained securely and completely within the explosive charge or within a suitable tunnel or cap well.

(b) When using detonating cord to initiate another explosive, a connection shall be prepared with the detonating cord threaded through, attached securely to, or otherwise in intimate contact with the explosive charge.

55.6-99 *Mandatory.* Only wooden or other nonsparking implements shall be used to punch holes in an explosive cartridge.

55.6-100 *Mandatory.* Tamping poles shall be of wood or other material acceptable to the Mine Safety and Health Administration. Couplers of tamping poles shall be of nonsparking materials.

55.6-101 *Mandatory.* Tamping shall not be done directly on a primer.

55.6-102 *Mandatory.* Unused explosives and detonators shall be moved to a safe location as soon as charging operations are completed.

55.6-103 *Mandatory.* Areas in which charged holes are awaiting firing shall be guarded, or barricaded and posted, or flagged against unauthorized entry.

55.6-104 *Mandatory.* When safety fuse has been used, men shall not return to misfired holes for at least 30 minutes.

55.6-105 *Mandatory.* When electric blasting caps have been used, men shall not return to misfired holes for at least 15 minutes.

55.6-106 *Mandatory.* Faces and muckpiles shall be examined by a competent person for undetonated explosives or blasting agents found shall be disposed of safely.

55.6-107 *Mandatory.* Holes shall not be drilled where there is danger of intersecting a charged or misfired hole.

55.6-108 *Mandatory.* Fuse and igniters shall be stored in a cool, dry place away from oils or grease.

55.6-109 *Mandatory.* Safety fuse, igniter cord, and detonating cord shall not be used if they have been kinked, bent sharply, or otherwise damaged.

55.6-110 *Mandatory.* Fuses shall be cut and capped in safe, dry locations posted with "No Smoking" signs.

55.6-111 *Mandatory.* Blasting caps shall be crimped to fuses only with implements designed for that specific purpose.

55.6-112 *Mandatory.* The burning rate of the safety fuse in use at any time shall be measured, posted in conspicuous locations, and brought to the attention of all men concerned with blasting.

55.6-113 *Mandatory.* When firing from 1 to 15 blastholes with safety fuse ignited individually using hand-held lighters, the fuses shall be of such lengths to provide the minimum burning time specified in the following table for a particular size round:

Number of holes in a round	Minimum burning time, minutes
1	2
2-5	2⅔
6-10	3⅓
11-15	5

In no case shall any 40-second-per-foot safety fuse less than 36 inches long or any 30-second-per-foot safety fuse less than 48 inches long be used.

55.6-114 *Mandatory.* At least two men shall be present when lighting fuses, and no man shall light more than 15 individual fuses. If more than 15 holes per man are to be fired, igniter cord and connectors or electric blasting shall be used.

55.6-115 *Mandatory.* All detonating cord knots shall be tight and all connections shall be kept at right angles to the trunklines.

55.6-116 *Mandatory.* Fuse shall be ignited with hot-wire lighters, lead spitters, igniter cord, or other such devices designed for this purpose. Carbide lights shall not be used to light fuses.

55.6-117 *Mandatory.* Fuse shall not be ignited before the primer and the entire charge are securely in place.

55.6-118 *Mandatory.* When using safety fuse, where fly rock might damage unlit or burning fuses, timing shall be such that all fuses are burning within the holes before any hole detonates.

55.6-119 *Mandatory.* Electric detonators of different brands shall not be used in the same round.

55.6-120 *Mandatory.* Except when being tested with a blasting galvanometer:

(a) Electric detonators shall be kept shunted until they are being connected to the blasting line or wired into a blasting round.

(b) Wired rounds shall be kept shunted until they are being connected to the blasting line.

(c) Blasting lines shall be kept shunted until immediately before blasting.

55.6-121 *Mandatory.* When blasting electrically a blasting galvanometer, or other instrument that is specifically designed for testing blasting circuits, shall be used to test:

(a) In surface operations:

(1) Continuity of each electric blasting cap in the borehole prior to the addition of stemming.

(2) Resistance of individual series or the resistance of multiple balanced series to be connected in parallel prior to their connection to the blasting line.

(3) Continuity of blasting lines prior to the connection of electric blasting cap series.

(4) Total blasting circuit resistance prior to connection to the power source.

(b) In underground operations:

(1) Continuity of each electric blasting cap series.

(2) Continuity of blasting lines prior to the connection of electric blasting caps.

55.6-122 *Mandatory.* Permanent blasting lines shall be properly supported, insulated and kept in good repair.

55.6-123 *Mandatory.* When electric detonators are used, charging shall be stopped immediately when the presence of static electricity or stray currents is detected; the condition shall be remedied before charging is resumed.

55.6-124 *Mandatory.* When electric detonators are used, charging shall be suspended in surface mining, shaft sinking, and tunneling and men withdrawn to a safe location upon the approach of an electrical storm.

55.6-125 *Mandatory.* If branch circuits are used when blasts are fired from power circuits, safety switches located at safe distances from the blast areas shall be provided in addition to the main blasting switch.

55.6-126 *Mandatory.* Electric power distribution circuits shall be de-energized within 50 feet of boreholes containing electric blasting caps which can be initiated by conventional power sources or extraneous electricity except that such circuits need not be de-energized between 25 and 50 feet of such boreholes when stray current tests, conducted as frequently as necessary, measure a maximum stray current less than 0.05 amperes through a one-ohm resistor measured at the location of the electric blasting cap.

55.6-127 *Mandatory.* Blasting switches shall be locked in the open position, except when closed to fire and blast. Lead wires shall not be connected to the blasting switch until the shot is ready to be fired.

55.6-128 *Mandatory.* The key or other control to an electrical firing device shall be entrusted only to the person designated to fire the round or rounds.

55.6-129 *Mandatory.* Electric circuits from the blasting switches to the blast area shall not be grounded.

55.6-130 *Mandatory.* At least a 15-foot air gap shall be provided between the blasting circuit and the electric power source.

55.6-131 *Mandatory.* Power sources shall be suitable for the number of electric detonators to be fired and for the type of circuits used.

55.6-132 *Mandatory.* Delay connectors shall be treated and handled with the same safety precautions as detonators.

55.6-133 *Mandatory.* If any part of a blast is connected in parallel and is to be initiated from power lines or lighting circuits, the time of current flow shall be limited to a maximum of 25 milliseconds by incorporating an arcing control device in the blasting circuit or by interrupting the circuit with an explosive charge attached to one or both lead lines and initiated by a zero-delay electric blasting cap.

55.6-134 *Mandatory.* Tools used for opening metal or nailed wooden containers of explosives or detonators shall be of nonsparking materials.

55.6-135 *Mandatory.* Holes shall not be collared in bootlegs.

55.6-136 *Mandatory.* Black powder shall not be used for blasting except when a desired result cannot be obtained with another type of explosive such as in quarrying certain types of dimension stone.

55.6-137 *Mandatory.* In the use of black blasting powder:

(a) Containers shall not be opened in, or within 50 feet of, any magazine; within any building in which a fuel-fired or exposed-element electric heater is in operation; where electrical or incandescent-particle sparks could result in powder ignition; or within 50 feet of any open flame.

(b) Granular powder shall be transferred from containers only by pouring.

(c) Spills of granular powder shall be cleaned up promptly with nonsparking equipment; contaminated powder shall be put into a container of water and its content disposed of promptly after the granules have disintegrated, or the spill area shall be flushed with a copious amount of water to completely disintegrate the granules.

(d) Containers of powder shall be kept securely closed at all times other than when the powder is being transferred from or into a container.

(e) Containers of powder transported by vehicles shall be in a wholly enclosed cargo space.

(f) Misfires shall be disposed of by: (1) washing the stemming and powder charge from the borehole, and (2) removal and disposal of the initiator as a damaged explosive.

(g) Boreholes of shots that fire but fail to break, or fail to break properly, shall not be recharged for at least 12 hours.

55.6-138 *Mandatory.* Explosives or blasting agents shall not be loaded into drilled or sprung holes that could result in premature detonation from heat.

55.6-139 *Mandatory.* Blasting areas shall not be re-entered after firing until concentrations of smoke, dust, and fumes have been reduced to safe limits as required in, and determined by, mandatory standards 55.5-1 and 55.5-2, respectively.

55.6-140 *Mandatory.* Blasting circuits and electric blasting caps (which are capable of being initiated by conventional power sources) shall be protected from sources of extraneous electricity.

55.6-141 [Reserved]

55.6-142 *Mandatory.* Explosives or blasting agents shall not be loaded into boreholes through or with either drill stem equipment or other devices which could be extracted while containing explosives or blasting agents. The use of loading hose, collar sleeves or collar pipes is permitted.

55.6-143 through 55.6-158 [Reserved]

55.6-159 *Mandatory.* Powder chests shall be:

(a) Substantially constructed of nonsparking material on the inside.

(b) Posted with suitable warning signs.

(c) Located out of the blast area and out of the line of blasts.

(d) Emptied and their contents returned to the main magazine at the end of each shift unless the powder chest is located within the area continually attended by employees during shift changes.

(e) Separate for detonators and explosives unless separated by 4 inches of hard wood or the equivalent.

(f) Kept locked when unattended.

55.6-160 *Mandatory.* Ample warning shall be given before blasts are fired. All persons shall be cleared and removed from the blasting area unless suitable blasting shelters are provided to protect men endangered by concussion or flyrock from blasting.

55.6-161 *Mandatory.* If explosives are suspected of burning in a hole, all persons in the endangered area shall move to a safe location and no one shall return to the hole until the danger has passed, but in no case within 1 hour.

55.6-162 *Mandatory.* Lead wires and blasting lines shall not be strung across power conductors, pipelines, railroad tracks, or within 20 feet of bare powerlines. They shall be protected from sources of static or other electrical contact.

55.6-163 *Mandatory.* The double-trunkline or loop system shall be used in detonating-cord blasting.

55.6-164 *Mandatory.* Trunklines, in multiple-row blasts, shall make one or more complete loops, with crossties between loops at intervals of not over 200 feet.

55.6-165 through 55.6-167 [Reserved]

55.6-168 *Mandatory.* Misfires shall be reported to the proper supervisor and shall be disposed of safely before any other work is performed in that blasting area.

55.6-169 through 55.6-189 [Reserved]

SENSITIZED AMMONIUM NITRATE BLASTING AGENTS

All of the standards in this § 55.6 in which the term "explosives" appears are applicable to blasting agents (as well as to other explosives) unless blasting agents are expressly excluded.

55.6-190 through 55.6-192 [Reserved]

55.6-193 *Mandatory.* Where pneumatic loading is employed, before any type of blasting operation using blasting agents is put into effect, an evaluation of the potential hazard of static electricity shall be made. Adequate steps, including the grounding and bonding of the conductive parts of pneumatic loading equipment, shall be taken to eliminate the hazard of static electricity before blasting agent use is commenced.

55.6-194 *Mandatory.* Pneumatic loading equipment shall not be grounded to waterlines, air lines, rails, or the permanent electrical grounding systems.

55.6-195 *Mandatory.* Hoses used in connection with pneumatic loading machines shall be of the semiconductive type, having a total resistance low enough to permit the dissipation of static electricity and high enough to limit the flow of stray electric currents to a safe level. Wire-countered hose shall not be used because of the potential hazard from stray electric currents.

55.6-196 and 55.6-197 [Reserved]

55.6-198 *Mandatory.* Plastic tubes shall not be used as hole liners if blasting agents are loaded pneumatically into holes containing an electric detonator.

55.6-199 [Reserved]

55.6-200 *Mandatory.* Vehicles used to transport blasting agents shall have substantially constructed bodies, no zinc or copper exposed in the cargo space and shall be freely vented. Blasting agents shall not be piled higher than the side or end enclosures of open-body vehicles. If an enclosed screw conveyor is used to discharge blasting agents from the vehicle the conveyor shall be protected against excessive internal pressure and excessive frictional heat.

55.6-221 through 55.6-249 [Reserved]

MISCELLANEOUS

55.6-250 *Mandatory.* Smoking and open flames, except for the use of suitable devices for igniting safety fuse or the use of approved heating devices, shall not be permitted within 50 feet as measured by the line of sight of explosives, blasting agents, or detonators or within 25 feet when out of line of sight and separated by permanent noncombustible barriers in underground active workings.

(Sec. 101, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811), and sec. 301(c)(3), Pub. L. 95-164, 91 Stat. 1318 (30 U.S.C. 961(c)(3)))

[34 FR 12504, July 31, 1969, as amended at 35 FR 3661, Feb. 25, 1970; 35 FR 18588, Dec. 8, 1970; 37 FR 14368, July 19, 1972; 39 FR 24317, July 1, 1974; 41 FR 23612, June 10, 1976; 41 FR 33263, Aug. 9, 1976; 44 FR 48541, Aug. 17, 1979; 44 FR 53703, Sept. 14, 1979]

§ 55.7 Drilling.

55.7-1 [Reserved]

55.7-2 *Mandatory.* Equipment defects affecting safety shall be corrected before the equipment is used.

55.7-3 *Mandatory.* The drilling area shall be inspected for hazards before starting the drilling operations.

55.7-4 *Mandatory.* Men shall not be on a mast while the drill-bit is in operation unless they are provided with a safe platform from which to work and they are required to use safety belts to avoid falling.

55.7-5 *Mandatory.* Drill crews and others shall stay clear of augers or drill stems that are in motion. Persons shall not pass under or step over a moving stem or auger.

55.7-6 and 55.7-7 [Reserved]

55.7-8 *Mandatory.* When a drill is being moved from one drilling area to another, drill steel, tools, and other equipment shall be secured and the mast placed in a safe position.

55.7-9 *Mandatory.* If a drill helper assists the drill operator during movement of a drill to a new location, the helper shall be in sight of, or in communication with, the operator at all times.

55.7-10 *Mandatory.* In the event of power failure, drill controls shall be placed in the neutral position until power is restored.

55.7-11 *Mandatory.* The drill stem shall be resting on the bottom of the hole or on the platform with the stem secured to the mast before attempts are made to straighten a crossed cable on a reel.

55.7-12 *Mandatory.* While in operation, drills shall be attended at all times.

55.7-13 *Mandatory.* Drill holes large enough to constitute a hazard shall be covered or guarded.

55.7-14 through 55.7-17 [Reserved]

55.7-18 *Mandatory.* Men shall not hold the drill steel while collaring holes, or rest their hands on the chuck or centralizer while drilling.

55.7-19 through 55.7-49 [Reserved]

55.7-50 *Mandatory.* Receptacles or racks shall be provided for drill steel and tools stored or carried on drills.

55.7-51 *Mandatory.* To prevent injury to personnel, tools and other objects shall not be left loose on the mast or drill platform.

55.7-52 *Mandatory.* Persons shall not drill from—

(a) Positions which hinder their access to the control levers;

(b) Insecure footing or insecure staging; or

(c) Atop equipment not suitable for drilling.

55.7-53 *Mandatory.* Before hand-held drills are moved from one working area to another, air shall be turned off and bled from the hose.

55.7-54 through 55.7-100 [Reserved]

[34 FR 12504, July 31, 1969, as amended at 35 FR 3663, Feb. 25, 1970; 35 FR 18588, Dec. 8, 1970; 44 FR 48516, Aug. 17, 1979]

§ 55.8 Rotary jet piercing.

55.8-1 *Mandatory.* Jet piercing drills shall be provided with—

(a) A system to pressurize the equipment operator's cab, when a cab is provided; and

(b) A protective cover over the oxygen flow indicator.

55.8-2 *Mandatory.* Safety chains or other suitable locking devices shall be provided across connections to and between high pressure oxygen hose lines of 1-inch inside diameter or larger.

55.8-3 *Mandatory.* A suitable means of protection shall be provided for the employee when lighting the burner.

55.8-4 *Mandatory.* When rotary jet piercing equipment requires refueling at locations other than fueling stations, a system for fueling without spillage shall be provided.

55.8-5 *Mandatory.* Men shall not smoke and open flames shall not be used in the vicinity of the oxygen storage and supply lines. Signs warning against smoking and open flames shall be posted in these areas.

55.8-6 *Mandatory.* The oxygen intake coupling on jetpiercing drills shall be constructed so that only the oxygen hose can be coupled to it.

55.8-7 *Mandatory.* The combustion chamber of a jet drill stem which has been sitting unoperated in a drill hole shall be flushed with a suitable solvent after the stem is pulled up.

[34 FR 12504, July 31, 1969, as amended at 39 FR 24317, July 1, 1974; 44 FR 48516, Aug. 17, 1979]

§ 55.9 Loading, hauling, dumping.

55.9-1 *Mandatory.* Self-propelled equipment that is to be used during a shift shall be inspected by the equipment operator before being placed in operation. Equipment defects affecting safety shall be reported to, and recorded by the mine operator. The records shall be maintained at the mine or nearest mine office for at least 6 months from the date the defects are recorded. Such records shall be made available for inspection by the Secretary of Labor or his duly authorized representative.

55.9-2 *Mandatory.* Equipment defects affecting safety shall be corrected before the equipment is used.

55.9-3 *Mandatory.* Powered mobile equipment shall be provided with adequate brakes.

55.9-4 [Reserved]

55.9-5 *Mandatory.* Operators shall be certain by signal or other means, that all persons are clear before starting or moving equipment.

55.9-6 *Mandatory.* When the entire length of a conveyor is visible from the starting switch, the operator shall visually check to make certain that all persons are in the clear before starting the conveyor. When the entire length of the conveyor is not visible from the starting switch, a positive audible or visible warning system shall be installed and operated to warn persons that the conveyor will be started.

55.9-7 *Mandatory.* Unguarded conveyors with walkways shall be equipped with emergency stop devices or cords along their full length.

55.9-8 [Reserved]

55.9-9 *Mandatory.* Operators shall sound warning before starting trains and when trains approach crossings, other trains on adjacent tracks, persons, and any place where vision is obscured.

55.9-10 *Mandatory.* Equipment operators' cabs shall not be equipped, altered or otherwise modified in a manner which impairs operating visibility.

55.9-11 *Mandatory.* Cab windows shall be of safety glass or equivalent, in good condition and shall be kept clean.

55.9-12 *Mandatory.* Cabs of mobile equipment shall be kept free of extraneous materials.

55.9-13 *Mandatory.* Adequate backstops or brakes shall be installed on inclined-conveyor drive units to prevent conveyors from running in reverse if a hazard to personnel would be caused.

55.9-14 *Mandatory.* No person shall be permitted to ride a power-driven chain, belt, or bucket conveyor, unless the belt is specifically designed for the transportation of persons.

55.9-15 *Mandatory.* Unless the operator is otherwise protected, slushers in excess of 10 horsepower shall be provided with backlash guards. All slushers shall be equipped with rollers, and drum covers, and anchored securely before slushing operations are started.

55.9-16 *Mandatory.* Roadbeds, rails, joints, switches, frogs, and other trackage elements on railroads subject to the control of the operator shall be designed, installed and maintained in a safe manner consistent with the speed and type of haulage.

55.9-17 *Mandatory.* Equipment operating speeds shall be consistent with conditions of roadways, grades, clearance, visibility, traffic, and the type of equipment used.

55.9-18 [Reserved]

55.9-19 *Mandatory.* Track guardrails, lead rails, and frogs shall be protected or blocked so as to prevent a person's foot from becoming wedged.

55.9-20 *Mandatory.* Positive-acting stopblocks, derail devices, track skates, or other adequate means shall be installed wherever necessary to protect persons from runaway or moving railroad equipment.

55.9-21 [Reserved]

155.9-22 *Mandatory.* Berms or guards shall be provided on the outer bank of elevated roadways.

55.9-23 *Mandatory.* Trackless haulage equipment shall be operated under power control at all times.

55.9-24 *Mandatory.* Mobile equipment operators shall have full control of the equipment while it is in motion.

55.9-25 *Mandatory.* Dippers, buckets, loading booms, or heavy suspended loads shall not be swung over the cabs of haulage vehicles until the drivers are out of the cabs and in safe locations, unless the trucks are designed specifically to protect the drivers from falling material.

55.9-26 *Mandatory.* A quick-close type air valve shall be provided on each piece of pneumatic-powered loading, hauling, and dumping equipment. The valve shall be closed except when the equipment is being operated.

55.9-27 *Mandatory.* When an operator is present, men shall notify him before getting on or off equipment.

55.9-28 *Mandatory.* Switch throws shall be installed so as to provide adequate clearance for switchmen.

55.9-29 [Reserved]

55.9-30 *Mandatory.* Men shall not work or pass under the buckets or booms of loaders in operation.

55.9-31 *Mandatory.* When traveling between work areas, the equipment shall be secured in the travel position.

55.9-32 *Mandatory.* Dippers, buckets, scraper blades, and similar movable parts shall be secured or lowered to the ground when not in use.

55.9-33 [Reserved]

55.9-34 *Mandatory.* Haulage equipment shall be loaded in a manner to minimize spillage during haulage.

55.9-35 *Mandatory.* Movements of two or more pieces of rail equipment operating independently on the same track shall be suitably controlled for safe operation.

55.9-36 *Mandatory.* Electrically-powered mobile equipment shall not be left unattended unless the master switch is in the off position, all operating controls are in the neutral position, and the brakes are set or other equivalent precautions are taken against rolling.

55.9-37 *Mandatory.* Mobile equipment shall not be left unattended unless the brakes are set. Mobile equipment with wheels or tracks, when parked on a grade, shall be either blocked or turned into a bank or rib; and the bucket or blade lowered to the ground to prevent movement.

55.9-38 [Reserved]

55.9-39 *Mandatory.* Men shall not get on or off moving equipment, except that trainmen may get on or off of slowly moving trains.

55.9-40 *Mandatory.* Men shall not be transported:

(a) In or on dippers, forks, clamshells, beds of trucks unless special provisions are made for their safety, or buckets except shaft buckets.

(b) On top of loaded haulage equipment.

(c) Outside the cabs and beds of mobile equipment, except trains.

(d) Between cars of trains.

(e) In conveyances equipped with unloading devices unless means are provided to prevent accidental starting of the unloading mechanism.

55.9-41 *Mandatory.* Only authorized persons shall be permitted to ride on trains or locomotives and they shall ride in a safe position.

55.9-42 *Mandatory.* Rocker-bottom or bottom-dump rail cars shall be equipped with locking devices.

55.9-43 and 55.9-44 [Reserved]

55.9-45 *Mandatory.* Equipment which is to be hauled shall be loaded and protected so as to prevent sliding or spillage.

55.9-46 *Mandatory.* Backpoling of trolleys shall be avoided wherever possible; but when necessary, backpoling shall be done only at slow speeds.

55.9-47 *Mandatory.* Parked railcars, unless held effectively by brakes shall be blocked securely.

55.9-48 *Mandatory.* Railroad cars with braking systems, when in use, shall be equipped with effective brake shoes.

55.9-49 *Mandatory.* When in the dark or under conditions of limited visibility, all vehicles carrying loads which project beyond the sides or more than four feet beyond the rear of the vehicles shall display a warning light at the end of the projection; or in the light, a warning flag not less than 12 inches square shall be displayed at the end of the projection.

55.9-50 *Mandatory.* Railcars shall not be left on side tracks unless ample clearance is provided for traffic on adjacent tracks.

55.9-51 *Mandatory.* Persons shall not go over, under, or between cars unless the train is stopped and the motorman has been notified and the notice acknowledged.

55.9-52 *Mandatory.* Inability of a motorman to clearly recognize his brakeman's signals when the train is under the direction of the brakeman shall be construed by the motorman as a stop signal.

55.9-53 *Mandatory.* Water, debris, or spilled material which create hazards to moving equipment shall be removed.

55.9-54 *Mandatory.* Berms, bumper blocks, safety hooks, or similar means shall be provided to prevent overtravel and overturning at dumping locations.

55.9-55 *Mandatory.* Where there is evidence that the ground at a dumping place may fail to support the weight of a vehicle, loads shall be dumped back from the edge of the bank.

55.9-56 *Mandatory.* Where necessary, bumper blocks or the equivalent shall be provided at track dead ends.

55.9-57 *Mandatory.* Grizzlies, grates, and other stationary sizing devices shall be anchored securely.

55.9-58 *Mandatory.* If truck spotters are used, they shall be well in the clear while trucks are backing into dumping positions and dumping; lights shall be used at night to direct trucks.

55.9-59 *Mandatory.* Public and permanent railroad crossings shall be posted with warning signs or signals, or shall be guarded when trains are passing and shall be planked or otherwise filled between the rails.

55.9-60 *Mandatory.* Where overhead clearance is restricted, warning devices shall be installed and the restricted area shall be conspicuously marked.

55.9-61 *Mandatory.* Stockpile and muckpile faces shall be trimmed to prevent hazards to personnel.

55.9-62 *Mandatory.* Rocks too large to be handled safely shall be broken before loading.

55.9-63 *Mandatory.* Ramps and dumping facilities shall—

(a) Be of substantial construction; and

(b) Have suitable width, clearance, and headroom to accommodate the equipment using the facilities.

55.9-64 *Mandatory.* Chute-loading installations shall be designed so that the men pulling chutes are not required to be in a hazardous position while loading cars.

55.9-65 *Mandatory.* Cars shall not be coupled, or uncoupled, manually from the inside of curves unless the railroad and cars are so designed to eliminate any hazard from manual coupling.

55.9-66 *Mandatory.* When a locomotive on one track is used to move equipment on a different track, a suitable chain, cable, or drawbar shall be used.

55.9-67 *Mandatory.* Facilities used to transport men to and from work areas shall not be overcrowded.

55.9-68 *Mandatory.* Lights, flares, or other warning devices shall be posted when parked equipment creates a hazard to vehicular traffic.

55.9-69 *Mandatory.* Tires shall be deflated before repairs on them are started and adequate means shall be provided to prevent wheel locking rims from creating a hazard during tire inflation.

55.9-70 *Mandatory.* A tow bar of substantial construction or other suitable means of control shall be used to tow heavy equipment. A substantial safety chain or wire rope shall be used in conjuction with any primary rigging.

55.9-71 *Mandatory.* Traffic rules including speed, signals, and warning signs shall be standardized at each mine and posted.

55.9-72 *Mandatory.* Persons attempting to free hangups shall be experienced persons who understand the hazards involved.

55.9-73 *Mandatory.* Defective equipment, removed from service as unsafe to operate, shall be tagged to prohibit further use until repairs are completed.

55.9-74 *Mandatory.* Dust shall be suitably controlled at muck piles, material transfer points, crushers, and on haulage roads where hazards to personnel may be created as a result of impaired visibility.

55.9-75 through 55.9-82 [Reserved]

55.9-83 *Mandatory.* Where possible at least 30 inches continuous clearance from the farthest projection of moving railroad equipment shall be provided on at least one side of the tracks; all places where it is not possible to provide 30-inch clearance shall be marked conspicuously.

55.9-84 [Reserved]

55.9-85 *Mandatory.* Tools, materials and equipment shall not be transported with persons in vehicles, rail cars, and other conveyances unless means have been provided to make such transportation safe.

55.9-86 [Reserved]

55.9-87 *Mandatory.* Heavy duty mobile equipment shall be provided with audible warning devices. When the operator of such equipment has an obstructed view to the rear, the equipment shall have either an automatic reverse signal alarm which is audible above the surrounding noise level or an observer to signal when it is safe to back up.

55.9-88 *Mandatory.* (a) Excluding equipment that is operated by remote control, all self-propelled track-type (crawler mounted) or wheeled (rubber-tired) scrapers; front-end loaders; dozers; tractors, including industrial and agricultural tractors but not including over-the-road type tractors (the type that pull trailers or vans on highways); and motor graders; and wheeled prime movers (a tractor of the type and kind normally used as the mode of power for rubber-tired scrapers); all as used in metal and nonmetal mining operations, with or without attachments, shall be used in such mining only when equipped with (1) rollover protective structures (ROPS) in accordance with the requirements of paragraphs (b) through (g) of this standard, as applicable, and (2) seat belts meeting the requirements of the Society of Automotive Engineers (SAE), Motor Vehicle Seat Belts Assemblies—SAE J4c, approved November 1955, revised July 1965, Seat Belt Hardware Test Procedures—SAE J140a, approved April 1970, revised February 1973; Seat Belt Hardware Performance Requirements—SAE J141; Operator Protection for Wheel Type Agricultural and Industrial Tractors—SAE J333a, approved April 1968, revised July 1970, conforms to ASAE S305; and Seat Belts for Construction Equipment—SAE J386, approved March 1968; and, in accordance with paragraphs (b), (c), and (e) of this standard, as applicable.

(b) Except as provided in paragraph (e) all self-propelled equipment described in paragraph (a) of this standard and manufactured on or after the effective date of this standard shall be equipped with (1) ROPS meeting the requirements of paragraph (d), and (2) seat belts meeting the requirements of SAE J4c, J140a, J141, J333a, and J386 specified in paragraph (a) of this standard.

(c) All self-propelled equipment described in paragraph (a) of this standard manufactured prior to the effective date of this standard and after June 30, 1969, shall be equipped with ROPS meeting the requirements of paragraphs (d) through (g) of this standard as appropriate, and seat belts, no later than the dates specified below:

(1) Equipment manufactured between July 1, 1971, and the effective date of this standard shall be equipped with ROPS and seat belts no later than 6 months after the effective date of this standard.

(2) Equipment manufactured between July 1, 1970, and June 30, 1971 shall be equipped with ROPS and seat belts no later than 10 months after the effective date of this standard.

(3) Equipment manufactured between July 1, 1969, and June 30, 1970, shall be equipped with ROPS and seat belts no later than 16 months after the effective date of this standard.

(4) Nothing in this standard shall preclude the issuance of an order because of imminent danger.

(d) Except as provided in paragraph (e) of this standard, self-propelled equipment described in paragraph (a) of this standard shall be deemed in compliance with the ROPS requirements of this standard if the ROPS meet the following requirements:

(1) The ROPS complies with the Society of Automotive Engineers, SAE Recommended Practice, Critical Zone—Characteristics and Dimensions for Operators of Construction and Industrial Machinery—SAE J397, approved July 1969, or Deflection Limiting Volume for Laboratory Evaluation of Roll-Over Protective Structures (ROPS) and Falling Object Protective Structures (FOPS) of Construction and Industrial Vehicles—SAE J397a, approved July 1969, revised January 1972, editorial change July 1973; and, as appropriate, the ROPS and installation of the ROPS meet the requirements of either SAE Recommended Practice, Performance Criteria for Roll-Over Protective Structures (ROPS) for Earthmoving, Construction, Logging, and Industrial Vehicles—SAE J1040, approved April 1974, or any of the following applicable SAE standards or recommended practices:

(i) Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired, Self-Propelled Scrapers—SAE J320a, approved November 1967, revised July 1969, editorial change June 1970; or

(ii) Minimum Performance Criteria for Roll-Over Protective Structures for Prime Movers—SAE J320b, approved November 1967, revised January 1972, editorial change September 1972; or

(iii) Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired Front-End Loaders and Rubber-Tired Dozers—SAE J394, approved July 1969, editorial change July 1970, or Minimum Performance Criteria for Roll-Over Protective Structures for Wheeled Front-End Loaders and Wheeled Dozers—SAE J394a, approved July 1969, revised March 1972, editorial change September 1972; or

(iv) Minimum Performance Criteria for Roll-Over Structures for Crawler Tractors and Crawler-Type Loaders—SAE J395, approved July 1969, editorial change July 1970, or Minimum Performance Criteria for Roll-Over Protective Structures for Track-Type Tractors and Track-Type Front-End Loaders—SAE J395a, approved July 1969, revised January 1972, editorial change September 1972; or

(v) Minimum Performance Criteria for Roll-Over Protective Structure for Motor Graders—SAE J396, approved 1969, editorial change July 1970, or Minimum Performance Criteria for Roll-Over Protective Structures for Motor Graders—SAE J396a, approved July 1969, revised March 1972, editorial change September 1972; or

(vi) Operator Protection for Wheel Type Agricultural and Industrial Tractors—SAE J333a, approved April 1968, revised July 1970, conforms to ASAE S305; and Protective Frame Test Procedure and Performance Requirements—SAE J334a, approved April 1968, revised July 1970, conforms to ASAE S306.

(2) The ROPS is installed on the equipment in accordance with the recommendations of the ROPS manufacturer. If the installation includes bolts and nuts, the bolts and nuts used to attach the ROPS to the equipment frame and to connect structural parts of the ROPS shall be SAE Grade 5 or 8 (SAE J429g and J995b).

(e) All self-propelled equipment described in paragraph (a) of this standard, manufactured prior to the effective date of this standard, shall be deemed in compliance with the standard if ROPS and seat belt installations meet the ROPS and seat belt requirements of the State of California; or the U.S. Army Corps of Engineers; or the Bureau of Reclamation; or MSHA coal mine regulations of the U.S. Department of Labor; or the Occupational Safety and Health Administration of the U.S. Department of Labor. The requirements in effect are:

(1) State of California: Title 8 of the California Administrative Code: Construction Safety Orders, Article 10, "Haulage and Earth Moving," 1591(i) and 1596 (Register 70, No. 40—10-3-70); General Industry Safety Orders, Article 25, "Industrial Trucks, Tractors, Haulage Vehicles, and Earth Moving Equipment," 3650-55 (Register 72, No. 6—2-5-72); and Logging and Sawmill Safety Orders, Article 7, "Tractor Yarding," 5243 (Register 69, No. 10—3-8-69), all issued by the Division of Industrial Safety, State of California.

(2) U.S. Army Corps of Engineers: Manuals—Corps of Engineers, U.S. Army Safety-General Safety Requirements, EM-385-1-1 (March 1967), or Change 1, March 27, 1972.

(3) Bureau of Reclamation, U.S. Department of the Interior: Section 9, "Machinery and Mechanized Equipment," Safety and Health Regulations for Construction, Part II—Bureau of Reclamation (September 1971).

(4) Mine Safety and Health Administration, U.S. Department of Labor: Section 77.403a, Part 77, Title 30, Code of Federal Regulations—Mandatory Safety Standards, Surface Coal Mines and Surface Work Areas of Underground Coal Mines, promulgated in the Federal Register (39 FR 24006-24009).

(5) Occupational Safety and Health Administration, U.S. Department of Labor: Sections 1926.1001 and 1926.1002, Title 29, Code of Federal Regulations—Safety and Health Regulations for Construction, promulgated in the Federal Register (37 FR 27585-27590), and republished in the Federal Register (39 FR 22880-22886).

(f) Any alteration, repair, or welding of the ROPS and ROPS-to-vehicle frame mounts shall be performed only with prior approval and with instructions from the ROPS manufacturer or under the instructions of a registered professional engineer; and the manufacturer, or engineer, as the case may be, shall decide what qualifications the welders involved in this operation must have.

(g) Each ROPS shall have the following information permanently affixed to the structure:

(1) Manufacturer's or fabricator's name and address; and

(2) ROPS model number, if any; and

(3) Make and model numbers of the equipment on which the ROPS is designed to fit.

(4) For equipment already in existence when this standard goes into effect, a satisfactory substitute for the above-required information will be a certificate from either the manufacturer of the ROPS or a registered professional engineer to the effect that the ROPS does meet the performance standards and is appropriate for the piece of equipment upon which it is installed.

(h) Publications to which references are made in this standard are hereby incorporated by reference and made a part hereof. The incorporated publications are available at each Metal and Nonmetal Safety and Health Subdistrict Office, MSHA. State of California safety orders are available from the State of California Office of Procurement, Documents Section, Post Office Box 20191, Sacramento, California 95820. The U.S. Army Corps of Engineers, Safety-General Safety Requirements are available from the U.S. Government Printing Office, Washington, D.C. 20402. Bureau of Reclamation Safety and Health Regulations for Construction are available from the Bureau of Reclamation, Division of Safety, Engineering and Research Center, Denver, Colorado 80225. SAE documents are available from the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 15096.

OMB Control No. 1219-0064, paragraph 55.9-1. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12504, July 31, 1969, as amended at 35 FR 3663, Feb. 25, 1970; 37 FR 14370, July 19, 1972; 41 FR 23613, June 10, 1976; 42 FR 7007, Feb. 4, 1977; 42 FR 29419, June 9, 1977; 42 FR 57040, Oct. 31, 1977; 43 FR 12318, Mar. 24, 1978; 44 FR 31916, June 1, 1979; 44 FR 48516, Aug. 17, 1979; 45 FR 68935, Oct. 17, 1980; 47 FR 14706, Apr. 6, 1982]

§ 55.10 Aerial tramways.

55.10-1 *Mandatory.* Buckets shall not be overloaded, and feed shall be regulated to prevent spillage.

55.10-2 *Mandatory.* Inspection and maintenance of carriers (including loading and unloading mechanisms), ropes and supports, and brakes shall be performed by competent persons according to the recommendations of the manufacturer.

55.10-3 *Mandatory.* Any hazardous defects shall be corrected before the equipment is used.

55.10-4 *Mandatory.* Positive-action-type brakes and devices which apply the brakes automatically in the event of a power failure shall be provided on aerial tramways.

55.10-5 *Mandatory.* Track cable connections shall not obstruct the passage of carriage wheels.

55.10-6 *Mandatory.* Towers shall be suitably protected from swaying buckets.

55.10-7 *Mandatory.* Guard nets or other suitable protection shall be provided where tramways pass over roadways, walkways, or buildings.

55.10-8 *Mandatory.* Persons other than maintenance men shall not ride aerial tramways unless the following features are provided:

(a) Two independent brakes, each capable of holding the maximum load;

(b) Direct communication between terminals;

(c) Power drives with emergency power available in case of primary power failure; and

(d) Buckets equipped with positive locks to prevent accidental tripping or dumping.

55.10-9 *Mandatory.* Men shall not ride loaded buckets.

55.10-10 *Mandatory.* Where possible, aerial tramways shall not be started until the operator has ascertained that everyone is in the clear.

[34 FR 12504, July 31, 1969, as amended at 35 FR 3663, Feb. 25, 1970; 44 FR 48516, Aug. 17, 1979]

§ 55.11 Travelways.

55.11-1 *Mandatory.* Safe means of access shall be provided and maintained to all working places.

55.11-2 *Mandatory.* Crossovers, elevated walkways, elevated ramps, and stairways shall be of substantial construction, provided with handrails, and maintained in good condition. Where necessary, toeboards shall be provided.

55.11-3 *Mandatory.* Ladders shall be of substantial construction and maintained in good condition.

55.11-4 *Mandatory.* Portable rigid ladders shall be provided with suitable bases and placed securely when used.

55.11-5 *Mandatory.* Fixed ladders shall be anchored securely and installed to provide at least 3 inches of toe clearance.

55.11-6 *Mandatory.* Fixed ladders shall project at least 3 feet above landings, or substantial handholds shall be provided above the landings.

55.11-7 *Mandatory.* Wooden components of ladders shall not be painted except with a transparent finish.

55.11-8 [Reserved]

55.11-9 *Mandatory.* Walkways with outboard railings shall be provided wherever persons are required to walk alongside elevated conveyor belts. Inclined railed walkways shall be nonskid or provided with cleats.

55.11-10 *Mandatory.* Vertical clearance above stair steps shall be a minimum of seven (7) feet, or suitable warning signs or similar devices shall be provided to indicate an impaired clearance.

55.11-11 *Mandatory.* Persons using ladders shall face the ladders and have both hands free for climbing and descending.

55.11-12 *Mandatory.* Openings above, below, or near travelways through which men or materials may fall shall be protected by railings, barriers, or covers. Where it is impractical to install such protective devices, adequate warning signals shall be installed.

55.11-13 *Mandatory.* Crossovers shall be provided where it is necessary to cross conveyors.

55.11-14 *Mandatory.* Moving conveyors shall be crossed only at designated crossover points.

55.11-15 [Reserved]

55.11-16 *Mandatory.* Regularly used walkways and travelways shall be sanded, salted, or cleared of snow and ice as soon as practicable.

55.11-17 *Mandatory.* Fixed ladders shall not incline backwards.

55.11-18 through 55.11-24 [Reserved]

55.11-25 *Mandatory.* Fixed ladders, except on mobile equipment, shall be offset and have substantial railed landings at least every 30 feet unless backguards or equivalent protection, such as safety belts and safety lines, are provided.

55.11-26 *Mandatory.* Fixed ladders 70 degrees to 90 degrees from the horizontal and 30 feet or more in length shall have backguards, cages or equivalent protection, starting at a point not more than seven (7) feet from the bottom of the ladders.

55.11-27 *Mandatory.* Scaffolds and working platforms shall be of substantial construction and provided with handrails and maintained in good condition. Floor boards shall be laid properly and the scaffolds and working platform shall not be overloaded. Working platforms shall be provided with toeboards when necessary.

[34 FR 12504, July 31, 1969, as amended at 35 FR 3664, Feb. 25, 1970; 37 FR 14370, July 19, 1972; 44 FR 48516, Aug. 17, 1979]

§ 55.12 Electricity.

55.12-1 *Mandatory.* Circuits shall be protected against excessive overload by fuses or circuits breakers of the correct type and capacity.

55.12-2 *Mandatory.* Electric equipment and circuits shall be provided with switches or other controls. Such switches or controls shall be of approved design and construction and shall be properly installed.

55.12-3 *Mandatory.* Individual overload protection or short circuit protection shall be provided for the trailing cables of mobile equipment.

55.12-4 *Mandatory.* Electrical conductors shall be of a sufficient size and current-carrying capacity to ensure that a rise in temperature resulting from normal operations will not damage the insulating materials. Electrical conductors exposed to mechanical damage shall be protected.

55.12-5 *Mandatory.* Mobile equipment shall not run over power conductors, nor shall loads be dragged over power conductors, unless the conductors are properly bridged or protected.

55.12-6 *Mandatory.* Distribution boxes shall be provided with a disconnecting device for each branch circuit. Such disconnecting devices shall be equipped or designed in such a manner that it can be determined by visual observation when such a device is open and that the circuit is deenergized, and the distribution box shall be labeled to show which circuit each device controls.

55.12-7 *Mandatory.* Trailing-cable and power-cable connections to junction boxes shall not be made or broken under load.

55.12-8 *Mandatory.* Power wires and cables shall be insulated adequately where they pass into or out of electrical compartments. Cables shall enter metal frames of motors, splice boxes, and electrical compartments only through proper fittings. When insulated wires, other than cables, pass through metal frames, the holes shall be substantially bushed with insulated bushings.

55.12-9 [Reserved]

55.12-10 *Mandatory.* Telephone and low-potential signal wire shall be protected by isolation or suitable insulation, or both, from contacting energized power conductors or any other power source.

55.12-11 *Mandatory.* High-potential electrical conductors shall be covered, insulated, or placed to prevent contact with low potential conductors.

55.12-12 *Mandatory.* The potential on bare signal wires accessible to contact by persons shall not exceed 48 volts.

55.12-13 *Mandatory.* Permanent splices and repairs made in power cables, including the ground conductor where provided, shall be: (a) Mechanically strong with electrical conductivity as near as possible to that of the original; (b) Insulated to a degree at least equal to that of the original, and sealed to exclude moisture; and (c) Provided with damage protection as near as possible to that of the original, including good bonding to the outer jacket.

55.12-14 *Mandatory.* Power cables energized to potentials in excess of 150 volts, phase-to-ground, shall not be moved with equipment unless sleds or slings, insulated from such equipment, are used. When such energized cables are moved manually, insulated hooks, tongs, ropes, or slings shall be used unless suitable protection for persons is provided by other means. This does not prohibit pulling or dragging of cable by the equipment it powers when the cable is physically attached to the equipment by suitable mechanical devices, and the cable is insulated from the equipment in conformance with other standards in this part.

55.12-15 [Reserved]

55.12-16 *Mandatory.* Electrically powered equipment shall be deenergized before mechanical work is done on such equipment. Power switches shall be locked out or other measures taken which shall prevent the equipment from being energized without the knowledge of the individuals working on it. Suitable warning notices shall be posted at the power switch and signed by the individuals who are to do the work. Such locks or preventive devices shall be removed only by the persons who installed them or by authorized personnel.

55.12-17 *Mandatory.* Power circuits shall be deenergized before work is done on such circuits unless hot-line tools are used. Suitable warning signs shall be posted by the individuals who are to do the work. Switches shall be locked out or other measures taken which shall prevent the power circuits from being energized without the knowledge of the individuals working on them. Such locks, signs, or preventative devices shall be removed only by the person who installed them or by authorized personnel.

55.12-18 *Mandatory.* Principal power switches shall be labeled to show which units they control, unless identification can be made readily by location.

55.12-19 *Mandatory.* Where access is necessary, suitable clearance shall be provided at stationary electrical equipment or switchgear.

55.12-20 *Mandatory.* Dry wooden platforms, insulating mats, or other electrically-nonconductive material shall be kept in place at all switchboards and power-control switches where shock hazards exist. However, metal plates on which a person normally would stand and which are kept at the same potential as the grounded, metal, non-current-carrying parts of the power switches to be operated may be used.

55.12-21 *Mandatory.* Suitable danger signs shall be posted at all major electrical installations.

55.12-22 *Mandatory.* Areas containing major electrical installations shall be entered only by authorized persons.

55.12-23 *Mandatory.* Electrical connections and resistor grids that are difficult or impractical to insulate shall be guarded, unless protection is provided by location.

55.12-24 [Reserved]

55.12-25 *Mandatory.* All metal enclosing or encasing electrical circuits shall be grounded or provided with equivalent protection. This requirement does not apply to battery-operated equipment.

55.12-26 *Mandatory.* Metal fencing and metal buildings enclosing transformers and switchgear shall be grounded.

55.12-27 *Mandatory.* Frame grounding or equivalent protection shall be provided for mobile equipment powered through trailing cables.

55.12-28 *Mandatory.* Continuity and resistance of grounding systems shall be tested immediately after installation, repair, and modification; and annually thereafter. A record of the resistance measured during the most recent tests shall be made available on a request by the Secretary or his duly authorized representative.

55.12-29 [Reserved]

55.12-30 *Mandatory.* When a potentially dangerous condition is found it shall be corrected before equipment or wiring is energized.

55.12-31 [Reserved]

55.12-32 *Mandatory.* Inspection and cover plates on electrical equipment and junction boxes shall be kept in place at all times except during testing or repairs.

55.12-33 *Mandatory.* Hand-held electric tools shall not be operated at high potential voltages.

55.12-34 *Mandatory.* Portable extension lights, and other lights that by their location present a shock or burn hazard, shall be guarded.

55.12-35 *Mandatory.* Lamp sockets shall be of a weatherproof type where they are exposed to weather or wet conditions that may interfere with illumination or create a shock hazard.

55.12-36 *Mandatory.* Fuses shall not be removed or replaced by hand in an energized circuit, and they shall not otherwise be removed or replaced in an energized circuit unless equipment and techniques especially designed to prevent electrical shock are provided and used for such purpose.

55.12-37 *Mandatory.* Fuse tongs or hot line tools shall be used when fuses are removed or replaced in high-potential circuits.

55.12-38 *Mandatory.* Trailing cables shall be attached to machines in a suitable manner to protect the cable from damage and to prevent strain on the electrical connections.

55.12-39 *Mandatory.* Surplus trailing cables to shovels, cranes and similar equipment shall be—

(a) Stored in cable boats;

(b) Stored on reels mounted on the equipment; or

(c) Otherwise protected from mechanical damage.

55.12-40 *Mandatory.* Operating controls shall be installed so that they can be operated without danger of contact with energized conductors.

55.12-41 *Mandatory.* Switches and starting boxes shall be of safe design and capacity.

55.12-42 *Mandatory.* Both rails shall be bonded or welded at every joint and rails shall be crossbonded at least every 200 feet if the track serves as the return trolley circuit. When rails are moved, replaced, or broken bonds are discovered, they shall be rebonded within three working shifts.

55.12-43 and 55.12-44 [Reserved]

55.12-45 *Mandatory.* Overhead high-potential powerlines shall be installed as specified by the National Electrical Code.

55.12-46 [Reserved]

55.12-47 *Mandatory.* Guy wires of poles supporting high-voltage transmission lines shall meet the requirements for grounding or insulator protection of the National Electrical Safety Code, Part 2, entitled "Safety Rules for the Installation and Maintenance of Electric Supply and Communication Lines," (also referred to as National Bureau of Standards Handbook 81, Nov. 1, 1961) and Supplement 2 thereof issued March 1968, which are hereby incorporated by reference and made a part hereof. These publications and documents may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration.

55.12-48 *Mandatory.* Telegraph, telephone, or signal wires shall not be installed on the same crossarm with power conductors. When carried on poles supporting powerlines, they shall be installed as specified by the National Electrical Code.

55.12-49 [Reserved]

55.12-50 *Mandatory.* Trolley wires shall be installed at least seven (7) feet above rails where height permits, and aligned and supported to suitably control sway and sag.

55.12-51 and 55.12-52 [Reserved]

55.12-53 *Mandatory.* Ground wires for lighting circuits powered from trolley wires shall be connected securely to the ground-return circuit.

55.12-54 through 55.12-64 [Reserved]

55.12-65 *Mandatory.* Powerlines, including trolley wires, and telephone circuits shall be protected against short circuits and lightning.

55.12-66 *Mandatory.* Where metallic tools or equipment can come in contact with trolley wires or bare powerlines, the lines shall be guarded or deenergized.

55.12-67 *Mandatory.* Transformers shall be totally enclosed, or shall be placed at least 8 feet above the ground, or installed in a transformer house, or surrounded by a substantial fence at least 6 feet high and at least 3 feet from any energized parts, casings, or wiring.

55.12-68 *Mandatory.* Transformer enclosures shall be kept locked against unauthorized entry.

55.12-69 *Mandatory.* Each ungrounded power conductor or telephone wire that leads underground and is directly exposed to lightning shall be equipped with suitable lightning arrestors of approved type within 100 feet of the point where the circuit enters the mine. Lightning arrestors shall be connected to a low resistance grounding medium on the surface and shall be separated from neutral grounds by a distance of not less than 25 feet.

55.12-70 [Reserved]

55.12-71 *Mandatory.* When equipment must be moved or operated near energized high-voltage powerlines (other than trolley lines) and the clearance is less than 10 feet, the lines shall be deenergized or other precautionary measures shall be taken.

[34 FR 12504, July 31, 1969, as amended at 35 FR 3664, Feb. 25, 1970; 35 FR 4515, Mar. 13, 1970; 35 FR 13588, Dec. 8, 1970; 37 FR 14370, July 19, 1972; 39 FR 24317, July 1, 1974; 42 FR 29419, June 8, 1977; 42 FR 36462, July 15, 1977; 42 FR 57040, Oct. 31, 1977; 44 FR 48517, Aug. 17, 1979]

§ 55.13 Compressed air and boilers.

GENERAL

55.13-1 *Mandatory.* All boilers and pressure vessels shall be constructed, installed, and maintained in accordance with the standards and specifications of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.

55.13-2 through 55.13-9 [Reserved]

COMPRESSED AIR

55.13-10 *Mandatory.* (a) Reciprocating-type air compressors rated over 10 horsepower shall be equipped with automatic temperature-actuated shutoff mechanisms which shall be set or adjusted to the compressor when the normal operating temperature is exceeded by more than 25 percent.

(b) However, this standard does not apply to reciprocating-type air compressors rated over 10 horsepower if equipped with fusible plugs that were installed in the compressor discharge lines before November 15, 1979, and designed to melt at temperatures at least 50 degrees below the flash point of the compressors' lubricating oil.

55.13-11 *Mandatory.* Air receiver tanks shall be equipped with one or more automatic pressure-relief valves. The total relieving capacity of the relief valves shall prevent pressure from exceeding the maximum allowable working pressure in a receiver tank by not more than 10 percent. Air receiver tanks also shall be equipped with indicating pressure gages which accurately measure the pressure within the air receiver tanks.

55.13-12 *Mandatory.* Compressor air intakes shall be installed to insure that only clean, uncontaminated air enters the compressors.

55.13-13 and 55.13-14 [Reserved]

55.13-15 *Mandatory.* (a) Compressed-air receivers and other unfired pressure vessels shall be inspected by inspectors holding a valid National Board Commission and in accordance with the applicable chapters of the National Board Inspection Code, a Manual for Boiler and Pressure Vessel Inspectors, 1979. This code is incorporated by reference and made a part of this standard, may be examined at any Metal and Nonmetal Mine Safety and Health District Office of the Mine Safety and Health Administration, and may be obtained from the publisher, the National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229.

(b) Records of inspections shall be kept in accordance with requirements of the National Board Inspection Code, and the records shall be made available to the Secretary or his authorized representative.

55.13-16 [Reserved]

55.13-17 *Mandatory.* Compressor discharge pipes where carbon build-up may occur shall be cleaned periodically as recommended by the manufacturer, but no less frequently than once every two (2) years.

55.13-18 [Reserved]

55.13-19 *Mandatory.* Repairs involving the pressure system of compressors, receivers, or compressed-air-powered equipment shall not be attempted until the pressure has been bled off.

55.13-20 *Mandatory.* At no time shall compressed air be directed toward a person. When compressed air is used, all necessary precautions shall be taken to protect persons from injury.

55.13-21 *Mandatory.* Except where automatic shutoff valves are used, safety chains or other suitable locking devices shall be used at connections to machines of high-pressure hose lines of ¾-inch inside diameter or larger, and between high-pressure hose lines of ¾-inch inside diameter or larger, where a connection failure would create a hazard.

55.13-22 through 55.13-29 [Reserved]

BOILERS

55.13-30 *Mandatory.* (a) Fired pressure vessels (boilers) shall be equipped with water level gages, pressure gages, automatic pressure-relief valves, blowdown piping, and other safety devices approved by the American Society of Mechanical Engineers to protect against hazards from overpressure, flameouts, fuel interruptions and low water level, all as required by the appropriate sections, chapters and appendices listed in paragraph (b) (1) and (2) below.

(b) These gages, devices and piping shall be designed, installed, operated, maintained, repaired, altered, inspected, and tested by inspectors holding a valid National Board Commission and in accordance with the following listed sections, chapters and appendices:

(1) The ASME Boiler and Pressure Vessel Code, 1977, published by the American Society of Mechanical Engineers.

SECTION AND TITLE

I Power Boilers.
II Material Specifications—Part A—Ferrous.
II Material Specifications—Part B—Nonferrous.
II Material Specifications—Part C—Welding Rods, Electrodes, and Filler Metals.
IV Heating Boilers.
V Nondestructive Examination.
VI Recommended Rules for Care and Operation of Heating Boilers.
VII Recommended Rules for Care of Power Boilers.

(2) The National Board Inspection Code, a Manual for Boiler and Pressure Vessel Inspectors, 1979, published by the National Board of Boiler and Pressure Vessel Inspectors.

CHAPTER AND TITLE

I Glossary of Terms
II Inspection of Boilers and Pressure Vessels.
III Repairs and Alterations to Boiler and Pressure Vessels by Welding.
IV Shop Inspection of Boilers and Pressure Vessels.
V Inservice Inspection of Pressure Vessels by Authorized Owner-User Inspection Agencies.

APPENDIX AND TITLE

A Safety and Safety Relief Valves.
B Non-ASME Code Boilers and Pressure Vessels.
C Storage of Mild Steel Covered Arc Welding Electrodes.
D-R National Board "R" (Repair) Symbol Stamp.
D-VR National Board "VR" (Repair of Safety and Safety Relief Valve) Symbol Stamp.
D-VR1 Certificate of Authorization for Repair Symbol Stamp for Safety and Safety Relief Valves.
D-VR2 Outline of Basic Elements of Written Quality Control System for Repairers of ASME Safety and Safety Relief Valves.
D-VR3 Nameplate Stamping for "VR".
E Owner-user Inspection Agencies.
F Inspection Forms.

(c) Records of inspections and repairs shall be kept in accordance with the requirements of the ASME Boiler and Pressure Vessel Code and the National Board Inspection Code. The records shall be made available to the Secretary or his authorized representative.

(d) Sections of the ASME Boiler and Pressure Vessel Code, 1977, listed in paragraph (b)(1) above, and chapters and appendices of the National Board Inspection Code, 1979, listed in paragraph (b)(2) above, are incorporated by reference and made a part of this standard. These publications may be obtained from the publishers, the American Society of Mechanical Engineers, 345 East Forty-seventh Street, New York, N.Y. 10017, and the National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229.

The publications may be examined at any Metal and Nonmetal Mine Safety and Health District Office of the Mine Safety and Health Administration.

55.13-31 through 55.13-34 [Reserved]

OMB CONTROL Nos. 1219-0056, paragraph 55.13-15 and 1219-0063, paragraph 55.13-30 (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12504, July 31, 1969, as amended at 35 FR 3664, Feb. 25, 1970; 37 FR 14370, July 19, 1972; 44 FR 48517, Aug. 17, 1979; 44 FR 68828, Nov. 30, 1979; 47 FR 14706, Apr. 6, 1982]

§ 55.14 Use of equipment.

GUARDS

55.14-1 *Mandatory.* Gears; sprockets; chains; drive, head, tail, and takeup pulleys; flywheels; couplings; shafts; sawblades; fan inlets; and similar exposed moving machine parts which may be contacted by persons, and which may cause injury to persons, shall be guarded.

55.14-2 *Mandatory.* Overhead belts shall be guarded if the whipping action from a broken belt would be hazardous to persons below.

55.14-3 *Mandatory.* Guards at conveyor-drive, conveyor-head, and conveyor-tail pulleys shall extend a distance sufficient to prevent a person from accidentally reaching behind the guard and becoming caught between the belt and the pulley.

55.14-4 and 55.14-5 [Reserved]

55.14-6 *Mandatory.* Except when testing the machinery, guards shall be securely in place while machinery is being operated.

55.14-7 *Mandatory.* Guards shall be of substantial construction and properly maintained.

55.14-8 *Mandatory.* Stationary grinding machines other than special bit grinders shall be equipped with:

(a) Peripheral hoods (less than 90° throat openings) capable of withstanding the force of a bursting wheel;

(b) Adjustable tool rests set as close as practical to the wheel; and

(c) Safety washers.

55.14-9 *Mandatory.* Grinding wheels shall be operated within the specifications of the manufacturer of the wheel.

55.14-10 *Mandatory.* Hand-held power tools, other than rock drills; shall be equipped with controls requiring constant hand or finger pressure to operate the tools or shall be equipped with friction or other equivalent safety devices.

55.14-11 *Mandatory.* Guards, shields, or other suitable protection shall be provided in areas where flying or falling materials present a hazard to personnel.

55.14-12 [Reserved]

55.14-13 *Mandatory.* Fork-lift trucks, front-end loaders, and bulldozers shall be provided with substantial canopies when necessary to protect the operator.

55.14-14 *Mandatory.* Face shields or goggles, in good condition, shall be worn when operating a grinding wheel.

55.14-15 through 55.14-24 [Reserved]

METHODS AND PROCEDURES

55.14-25 [Reserved]

55.14-26 *Mandatory.* Unsafe equipment or machinery shall be removed from service immediately.

55.14-27 *Mandatory.* Operation of machinery or equipment shall be assigned only to competent persons.

55.14-28 [Reserved]

55.14-29 *Mandatory.* Repairs or maintenance shall not be performed on machinery until the power is off and the machinery is blocked against motion, except where machinery motion is necessary to make adjustments.

55.14-30 *Mandatory.* Men shall not work on or from a piece of mobile equipment in a raised position until it has been blocked in place securely. This does not preclude the use of equipment specifically designed as elevated mobile work platforms.

55.14-31 *Mandatory.* Drive belts shall not be shifted while in motion unless the machines are provided with mechanical shifters.

55.14-32 *Mandatory.* Belts, chains, and ropes shall not be guided onto power-driven moving pulleys, sprockets, or drums with the hands except on slow-moving equipment especially designed for hand feeding.

55.14-33 *Mandatory.* Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

55.14-34 *Mandatory.* Belt dressing shall not be applied manually while belts are in motion unless an aerosol-type dressing is used.

55.14-35 *Mandatory.* Machinery shall not be lubricated while in motion where a hazard exists, unless equipped with extended fittings or cups.

55.14-36 *Mandatory.* Tools and equipment shall not be used beyond the design capacity intended by the manufacturer, where such use may create a hazard to personnel.

55.14-37 through 55.14-44 [Reserved]

55.14-45 *Mandatory.* Welding operations shall be shielded and well-ventilated.

[34 FR 12504, July 31, 1969, as amended at 35 FR 3664, Feb. 25, 1970; 42 FR 7009, Feb. 4, 1977; 44 FR 68828, Nov. 30, 1979]

§ 55.15 Personal protection.

55.15-1 *Mandatory.* Adequate first-aid materials, including stretchers and blankets, shall be provided at places convenient to all working areas. Water or neutralizing agents shall be available where corrosive chemicals or other harmful substances are stored, handled, or used.

55.15-2 *Mandatory.* All persons shall wear suitable hard hats when in or around a mine or plant where falling objects may create a hazard.

55.15-3 *Mandatory.* All persons shall wear suitable protective footwear when in or around an area of a mine or plant where a hazard exists which could cause an injury to the feet.

55.15-4 *Mandatory.* All persons shall wear safety glasses, goggles, or face shields or other suitable protective devices when in or around an area of a mine or plant where a hazard exists which could cause injury to unprotected eyes.

55.15-5 *Mandatory.* Safety belts and lines shall be worn when men work where there is danger of falling; a second person shall tend the lifeline when bins, tanks, or other dangerous areas are entered.

55.15-6 *Mandatory.* Special protective equipment and special protective clothing shall be provided, maintained in a sanitary and reliable condition and used whenever (1) hazards of process or environment, (2) chemical hazards, (3) radiological hazards, or (4) mechanical irritants are encountered in a manner capable of causing injury or impairment.

55.15-7 *Mandatory.* Protective clothing or equipment and face shields or goggles shall be worn when welding, cutting, or working with molten metal.

55.15-8 through 55.15-19 [Reserved]

55.15-20 *Mandatory.* Life jackets or belts shall be worn where there is danger from falling into water.

[34 FR 12504, July 31, 1969, as amended at 35 FR 3664, Feb. 25, 1970; 35 FR 18589, Dec. 8, 1970; 39 FR 24317, July 1, 1974; 42 FR 57040, Oct. 31, 1977; 44 FR 48518, Aug. 17, 1979]

§ 55.16 Materials storage and handling.

55.16-1 *Mandatory.* Supplies shall not be stacked or stored in a manner which creates tripping or fall-of-material hazards.

55.16-2 *Mandatory.* (a) Bins, hoppers, silos, tanks, and surge piles, where loose unconsolidated materials are stored, handled or transferred shall be—

(1) Equipped with mechanical devices or other effective means of handling materials so that during normal operations persons are not required to enter or work where they are exposed to entrapment by the caving or sliding of materials; and

(2) Equipped with supply and discharge operating controls. The controls shall be located so that spills or overruns will not endanger persons.

(b) Where persons are required to move around or over any facility listed in this standard, suitable walkways or passageways shall be provided.

(c) Where persons are required to enter any facility listed in this standard for maintenance or inspection purposes, ladders, platforms, or staging shall be provided. No person shall enter the facility until the supply and discharge of materials have ceased and the supply and discharge equipment is locked out. Persons entering the facility shall wear a safety belt or harness equipped with a lifeline suitably fastened. A second person, similarly equipped, shall be stationed near where the lifeline is fastened and shall constantly adjust it or keep it tight as needed, with minimum slack.

55.16-3 *Mandatory.* Materials that can create hazards if accidentally liberated from their containers shall be stored in a manner that minimizes the dangers.

55.16-4 *Mandatory.* Hazardous materials shall be stored in containers of a type approved for such use by recognized agencies; such containers shall be labeled appropriately.

55.16-5 *Mandatory.* Compressed and liquid gas cylinders shall be secured in a safe manner.

55.16-6 *Mandatory.* Valves on compressed gas cylinders shall be protected by covers when being transported or stored, and by a safe location when the cylinders are in use.

55.16-7 *Mandatory.* (a) Taglines shall be attached to loads that may require steadying or guidance while suspended.

(b) Hitches and slings used to hoist materials shall be suitable for the particular material handled.

55.16-8 [Reserved]

55.16-9 *Mandatory.* Men shall stay clear of suspended loads.

55.16-10 *Mandatory.* To protect personnel, material shall not be dropped from an overhead elevation until the drop area is first cleared of personnel and the area is then either guarded or a suitable warning is given.

55.16-11 *Mandatory.* Men shall not ride on loads being moved by cranes or derricks, nor shall they ride the hoisting hooks unless such method eliminates a greater hazard.

55.16-12 *Mandatory.* Chemical substances, including concentrated acids and alkalies, shall be stored to prevent inadvertent contact with each other or with other substances, where such contact could cause a violent reaction or the liberation of harmful fumes or gases.

55.16-13 *Mandatory.* Suitable warning shall be given before molten metal is poured and before a container of molten metal is moved.

55.16-14 *Mandatory.* Operator-carrying overhead cranes shall be provided with:

(a) Bumpers at each end of each rail;

(b) Automatic switches to halt uptravel of the blocks before they strike the hoist;

(c) Effective audible warning signals within easy reach of the operator; and

(d) A means to lockout the disconnect switch.

55.16-15 *Mandatory.* No person shall work from or travel on the bridge of an overhead crane unless the bridge is provided with substantial footwalks with toeboards and railings the length of the bridge.

55.16-16 *Mandatory.* Fork and other similar types of lift trucks shall be operated with the—

(a) Upright tilted back to steady and secure the load;

(b) Load in the upgrade position when ascending or descending grades in excess of 10 percent;

(c) Load not raised or lowered enroute except for minor adjustments; and

(d) Load-engaging device downgrade when traveling unloaded on all grades.

[34 FR 12504, July 31, 1969, as amended at 35 FR 3664, Feb. 25, 1970; 44 FR 48519, Aug. 17, 1979]

§ 55.17 Illumination.

55.17-1 *Mandatory.* Illumination sufficient to provide safe working conditions shall be provided in and on all surface structures, paths, walkways, stairways, switch panels, loading and dumping sites, and work areas.

§ 55.18 Safety programs.

55.18-1 [Reserved]

55.18-2 *Mandatory.* (a) A competent person designated by the operator shall examine each working place at least once each shift for conditions which may adversely affect safety or health. The operator shall promptly initiate appropriate action to correct such conditions.

(b) A record that such examinations were conducted shall be kept by the operator for a period of one (1) year, and shall be made available for review by the Secretary or his authorized representative.

(c) In addition, conditions that may present an imminent danger which are noted by the person conducting the examination shall be brought to the immediate attention of the operator who shall withdraw all persons from the area affectd (except persons referred to in section 104(c) of the Federal Mine Safety and Health Act of 1977) until the danger is abated.

55.18-3 through 55.18-5 [Reserved]

55.18-6 *Mandatory.* New employees shall be indoctrinated in safety rules and safe work procedures.

55.18-7 and 55.18-8 [Reserved]

55.18-9 *Mandatory.* When persons are working at the mine, a competent person designated by the mine operator shall be in attendance to take charge in case of an emergency.

55.18-10 *Mandatory.* Selected supervisors shall be trained in first aid. First aid training shall be made available to all interested employees.

55.18-11 [Reserved]

55.18-12 *Mandatory.* Emergency telephone numbers shall be posted at appropriate telephones.

55.18-13 *Mandatory.* A suitable communication system shall be provided at the mine to obtain assistance in the event of an emergency.

55.18-14 *Mandatory.* Arrangements shall be made in advance for obtaining emergency medical assistance and transportation for injured persons.

55.18-15 through 55.18-19 [Reserved]

55.18-20 *Mandatory.* No employee shall be assigned, or allowed, or be required to perform work alone in any area where hazardous conditions exist that would endanger his safety unless he can communicate with others, can be heard, or can be seen.

OMB CONTROL No. 1219-0059, paragraph 55.18-2. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12504, July 31, 1969, as amended at 35 FR 3664, Feb. 25, 1970; 38 FR 23380, Aug. 29, 1973; 44 FR 48519, Aug. 17, 1979; 44 FR 68828, Nov. 30, 1979; 47 FR 14706, Apr. 6, 1982]

§ 55.19 Man hoisting.

The hoisting standards in this section apply to those hoists and appurtenances used for hoisting persons. However, where persons may be endangered by hoists and appurtenances used solely for handling ore, rock, and materials, the appropriate standards should be applied.

Emergency hoisting facilities should conform to the extent possible to safety requirements for other hoists, and should be adequate to remove the persons from the mine with a minimum of delay.

HOISTS

55.19-1 *Mandatory.* Hoists shall have rated capacities consistent with the loads handled and the recommended safety factors of the ropes used.

55.19-2 *Mandatory.* Hoists shall be anchored securely.

55.19-3 *Mandatory.* Belt, rope, or chains shall not be used to connect driving mechanisms to man hoists.

55.19-4 *Mandatory.* Any hoist used to hoist men shall be equipped with a brake or brakes which shall be capable of holding its fully loaded cage, skip, or bucket at any point in the shaft.

55.19-5 *Mandatory.* The operating mechanism of the clutch of every man-hoist drum shall be provided with a locking mechanism, or interlocked electrically or mechanically with the brake to prevent accidental withdrawal of the clutch.

55.19-6 *Mandatory.* Automatic hoists shall be provided with devices that automatically apply the brakes in the event of power failure.

55.19-7 *Mandatory.* All man hoists shall be provided with devices to prevent overtravel. When utilized in shafts exceeding 100 feet in depth, such hoists shall also be provided with overspeed devices.

55.19-8 *Mandatory.* Where creep or slip may alter the effective position of safety devices, friction hoists shall be equipped with synchronizing mechanisms that recalibrate the overtravel devices and position indicators.

55.19-9 *Mandatory.* An accurate and reliable indicator of the position of the cage, skip, bucket, or cars in the shaft shall be provided.

55.19-10 *Mandatory.* Hoist controls shall be placed or housed so that the noise from machinery or other sources will not prevent hoistmen from hearing signals.

55.19-11 *Mandatory.* Flanges on drums shall extend radially a minimum of 4 inches or three rope diameters beyond the last wrap, whichever is the lesser.

55.19-12 *Mandatory.* Where grooved drums are used, the grooves shall be of suitable size and pitch for the ropes used.

55.19-13 *Mandatory.* Where any diesel or similar fuel-injection engine is used to power a hoist, the engine shall be equipped with a damper or other cutoff in its air intake system. The control handle shall be clearly labeled to indicate that its intended function is for emergency stopping only.

55.19-14 *Mandatory.* In a friction hoist installation, tapered guides or other approved devices shall be installed above and below the limits of regular travel of the conveyance and arranged to prevent overtravel in the event of failure of other devices.

55.19-15 and 55.19-16 [Reserved]

55.19-17 *Mandatory.* Each electric hoist shall be equipped with a manually-operable switch that will initiate emergency braking action to bring the conveyance and the counterbalance safely to rest. This switch shall be located within reach of the hoistman in case the manual controls of the hoist fail.

55.19-18 *Mandatory.* When an overtravel by-pass switch is installed, the switch shall function so as to allow the conveyance to be moved through the overtravel position when the switch is held in the closed position by the hoistman. The overtravel bypass switch shall return automatically to the open position when released by the hoistman.

55.19-19 [Reserved]

WIRE ROPE

55.19-20 [Reserved]

55.19-21 *Mandatory.* The following static-load safety factors shall be used for selecting ropes to be used for hoisting men and for determining when such ropes shall be removed from man hoists:

Length of rope in shaft (feet)	Minimum factor of safety (new rope)	Minimum factor of safety (remove)
500 or less	8	6.4
501 to 1,000	7	5.8
1,001 to 2,000	6	5.0
2,001 to 3,000	5	4.3
3,001 or more	4	3.6

55.19-22 *Mandatory.* The end of the rope at the drum shall make at least one full turn on the drum shaft, or a spoke of the drum in the case of a free drum, and shall be fastened securely by means of rope clips or clamps. There shall be three full turns of cable or rope on the hoisting drum when the cable or rope is extended to its maximum working length. This standard does not apply to friction hoists.

55.19-23 [Reserved]

55.19-24 *Mandatory.* The rope shall be attached to the load by the thimble-and-clip method, the socketing method, or other approved method. If the socketing method is employed, zinc or its equivalent shall be used. The use of Babbitt metal or lead for socketing wire ropes is prohibited. If the thimble-and-clip method is used, the following shall be observed:

(a) The rope shall be attached to the load by passing one end around an oval thimble that is attached to the load bending the end back so that it is parallel to the long or "live" end of the rope and fastening the two parts of the rope together with clips.

(b) The U-bolt of each clip shall encircle the short or "dead" end of the rope and the distance between clips shall not be less than the figures given in the accompanying table.

(c) As a minimum, the following number of clips or equivalent shall be used for various diameters of six-strand, 19-wire, plowsteel ropes:

(Follow manufacturer's recommendations for other kinds of wire rope and clips.)

Diameter of rope, inches	Number of clips	Center-to-center spacing of clips, inches
¾	4	4½
⅞	4	5¼
1	4	6
1⅛	5	6¾
1¼	5	7½
1⅜	6	8¼
1½	6	9
1⅝	6	9¾
1¾	7	10½
1⅞	8	11¼
2	8	12
2¼	8	13
2½	8	14

(d) For all ropes less than three-quarter inch in diameter at least four clips or equivalent shall be used.

(e) When special conditions require the attachment of a sling to the hoisting cable to handle equipment in the shaft, the sling shall be attached by clips or equivalent in accordance with the table in paragraph (c) of this standard.

55.19-25 [Reserved]

55.19-26 *Mandatory.* Safety device attachments to hoist ropes shall be selected, installed, and maintained according to manufacturers' specifications to minimize internal corrosion and weakening of the hoist rope.

55.19-27 through 55.19-34 [Reserved]

HEADFRAMES AND SHEAVES

55.19-35 *Mandatory.* All headframes shall be constructed with suitable design considerations to allow for all dead loads, live loads, and wind loads.

55.19-36 *Mandatory.* Headframes shall be high enough to provide clearance for overtravel and safe stopping of the conveyance.

55.19-37 *Mandatory.* Fleet angles on hoists installed after November 15, 1979, shall not be greater than one and one-half degrees for smooth drums or two degrees for grooved drums.

55.19-38 *Mandatory.* Platforms with toeboards and handrails shall be provided around elevated head sheaves.

55.19-39 *Mandatory.* All personnel hoists, except emergency escape hoists and hoists with rope speeds of 200 feet per minute or less, installed after November 15, 1979, shall have drum and sheave tread diameters—

(1) Not less than 60 times the hoist rope diameter for slope or inclined shaft applications;

(2) Not less than 80 times the hoist rope diameter if the hoist ropes are one inch in diameter or greater, or not less than 60 times the hoist rope diameter if the hoist ropes are less than one inch in diameter for vertical shaft applications; or

(3) Not less than 100 times the hoist rope diameter for locked coil ropes.

55.19-40 *Mandatory.* Head, idler, knuckle, and curve sheaves shall have grooves of proper contour for the specific rope diameter used.

55.19-41 through 55.19-44 [Reserved]

CONVEYANCES

55.19-45 *Mandatory.* Man cages and skips used for hoisting or lowering employees or other persons in any vertical shaft or any incline-shaft with an angle of inclination of forty-five (45) degrees from the horizontal, shall be covered with a metal bonnet.

55.19-46 through 55.19-48 [Reserved]

55.19-49 *Mandatory.* Buckets shall not be used to hoist men except during shaft sinking operations, inspection, maintenance, and repairs.

55.19-50 *Mandatory.* Buckets used to hoist persons during vertical shaft sinking operations shall: (a) Be securely attached to a crosshead when traveling in either direction between the lower and upper crosshead parking locations; (b) Have overhead protection when the shaft depth exceeds 50 feet; (c) Have sufficient depth or a suitably designed platform to transport persons safely in a standing position; and (d) Have devices to prevent accidental dumping where the bucket is supported by a bail attached to its lower half.

55.19-51 [Reserved]

55.19-52 [Reserved]

55.19-53 *Mandatory.* In shaft sinking where a platform is suspended by wire ropes, such ropes shall have an approved rating for the suspended load.

55.19-54 *Mandatory.* Where rope guides are used in shafts other than in shaft sinking operations, the rope guides shall be a type of lock coil construction.

HOISTING PROCEDURES

55.19-55 *Mandatory.* When a manually operated hoist is used, a qualified hoistman shall remain within hearing of the telephone or signal device at all times while any person is underground.

55.19-56 *Mandatory.* When automatic hoisting is used, a competent operator of the hoist shall be readily available at or near the hoisting device while any person is underground.

55.19-57 *Mandatory.* No person shall operate a hoist unless within the preceding 12 months he has had a medical examination by a qualified, licensed physician who shall certify his fitness to perform this duty. Such certification shall be available at the mine.

55.19-58 *Mandatory.* Only experienced hoistmen shall operate the hoist except in cases of emergency and in the training of new hoistmen.

55.19-59 and 55.19-60 [Reserved]

55.19-61 *Mandatory.* The safe speed for hoisting men shall be determined for each shaft, and this speed shall not be exceeded. Men should not be hoisted at a speed faster than 2,500 feet per minute, except in an emergency.

55.19-62 *Mandatory.* Maximum normal operating acceleration and deceleration shall not exceed 6 feet per second per second. During emergency braking, the deceleration shall not exceed 16 feet per second per second.

55.19-63 *Mandatory.* Only authorized persons shall be in hoist rooms.

55.19-64 [Reserved]

55.19-65 *Mandatory.* Conveyances shall not be lowered by the brakes alone except during emergencies.

55.19-66 *Mandatory.* In shafts inclined over 45 degrees, the operator shall determine and post in the conveyance or at each shaft station the maximum number of persons permitted to ride in a hoisting conveyance at any one time. Each person shall be provided a minimum of 1.5 square feet of floor space.

55.19-67 *Mandatory.* During shift changes, an authorized person shall be in charge of each trip in which persons are hoisted.

55.19-68 Men shall enter, ride, and leave conveyances in an orderly manner.

55.19-69 *Mandatory.* Men shall not enter or leave conveyances which are in motion or after a signal to move the conveyance has been given to the hoistman.

55.19-70 *Mandatory.* Cage doors or gates shall be closed while men are being hoisted; they shall not be opened until the cage has come to a stop.

55.19-71 *Mandatory.* Men shall not ride in skips or buckets with muck, supplies, materials, or tools other than small hand tools.

55.19-72 *Mandatory.* When combinations of cages and skips are used in the same compartment, the cages shall be enclosed to protect personnel from flying material and the hoist speed reduced to man-speed as defined in standard 55.19-61, but not to exceed 1,000 feet per minute. Muck shall not be hoisted with personnel during shift changes.

55.19-73 *Mandatory.* Rock or supplies shall not be hoisted in the same shaft as men during shift changes, unless the compartments and dumping bins are partitioned to prevent spillage into the cage compartment.

55.19-74 *Mandatory.* Persons shall not ride the bail, rim, bonnet, or crosshead of any shaft conveyance except when necessary for inspection and maintenance, and then only when suitable protection for persons is provided.

55.19-75 *Mandatory.* Open hooks shall not be used to hoist buckets or other conveyances.

55.19-76 *Mandatory.* When men are hoisted in buckets, speeds shall not exceed 500 feet per minute and shall not exceed 200 feet per minute when within 100 feet of the intended station.

55.19-77 *Mandatory.* Buckets shall be stopped about 15 feet from the shaft bottom to await a signal from one of the crew on the bottom for further lowering.

55.19-78 *Mandatory.* All buckets shall be stopped after being raised about 3 feet above the shaft bottom. A bucket shall be stabilized before a hoisting signal is given to continue hoisting the bucket to the crosshead. After a hoisting signal is given, hoisting to the crosshead shall be at a minimum speed. The signaling device shall be attended constantly until a bucket reaches the guides. When persons are hoisted, the signaling devices shall be attended until the crosshead has been engaged.

55.19-79 *Mandatory.* Where mine cars are hoisted by cage or skip, means for bocking cars shall be provided at all landings and also on the cage.

55.19-80 *Mandatory.* When tools, timbers, or other materials are being lowered or raised in a shaft by means of a bucket, skip, or cage, they shall be secured or so placed that they will not strike the sides of the shaft.

55.19-81 *Manautory.* When conveyances controlled by a hoist operator are not in use, they shall be released and the conveyances shall be raised or lowered a suitable distance to prevent persons from boarding or loading the conveyances.

55.19-82 [Reserved]

55.19-83 *Mandatory.* A manually operated device shall be installed on each electric hoist that will allow the conveyance or counterbalance to be removed from an overtravel postion. Such device shall not release the brake, or brakes, holding the overtravelled conveyance or counterbalance until sufficient drive motor torque has been developed to assure movement of the conveyance or counterbalance in the correct direction only.

55.19-84 through 59.19-89 [Reserved]

SIGNALING

55.19-90 *Mandatory.* There shall be at least two effective approved methods of signaling between each of the shaft stations and the hoist room, one of which shall be a telephone or speaking tube.

55.19-91 *Mandatory.* Hoist operators shall accept hoisting instructions only by the regular signaling system unless it is out of order. In such an event, and during other emergencies, the hoist operator shall accept instructions to direct movement of the conveyances only from authorized persons.

55.19-92 *Mandatory.* A method shall be provided to signal the hoist operator from cages or other conveyances at any point in the shaft.

55.19-93 *Mandatory.* A standard code of hoisting signals shall be adopted and used at each mine. The movement of a shaft conveyance on a "one bell" signal is prohibited.

55.19-94 *Mandatory.* A legible signal code shall be posted prominently in the hoist house within easy view of the hoistman, and at each place where signals are given or received.

55.19-95 *Mandatory.* Hoisting signal devices shall be positioned within easy reach of persons on the shaft bottom or constantly attended by a person stationed on the lower deck of the sinking platform.

55.19-96 *Mandatory.* Any person responsible for receiving or giving signals for cages, skips, and man trips when men or materials are being transported shall be familiar with the posted signaling code.

55.19-97 through 55.19-99 [Reserved]

SHAFTS

55.19-100 *Mandatory.* Shaft landings shall be equipped with substantial safety gates so constructed that materials will not go through or under them; gates shall be closed except when loading or unloading shaft conveyances.

55.19-101 *Mandatory.* Positive stopblocks or a derail switch shall be installed on all tracks leading to a shaft collar or landing.

55.19-102 *Mandatory.* A means shall be provided to guide the movement of a shaft conveyance.

55.19-103 *Mandatory.* Dumping facilities and loading pockets shall be constructed so as to minimize spillage into the shaft.

55.19-104 *Mandatory.* Suitable clearance at shaft stations shall be provided to allow safe movement of persons, equipment and materials.

55.19-105 *Mandatory.* A safe means of passage around open shaft compartments shall be provided on landings with more than one entrance to the shaft.

55.19-106 *Mandatory.* Shaft sets shall be kept in good repair and clean of hazardous material.

55.19-107 *Mandatory.* Hoistmen shall be informed when men are working in a compartment affected by that hoisting operation and a "Men Working in Shaft" sign shall be posted at the hoist.

55.19-108 *Mandatory.* When men are working in a shaft "Men Working in Shaft" signs shall be posted at all devices controlling hoisting operations that may endanger such men.

55.19-109 *Mandatory.* Shaft inspection and repair work in vertical shafts shall be performed from substantial platforms equipped with bonnets or equivalent overhead protection.

55.19-110 *Mandatory.* A substantial bulkhead or equivalent protection shall be provided above men at work deepening a shaft.

55.19-111 *Mandatory.* Substantial fixed ladders shall be provided from the collar to as near the shaft bottom as practical during shaft-sinking operations, or an escape hoist powered by an emergency power source shall be provided. When persons are on the shaft bottom, a chain ladder, wire rope ladder, or other extension ladders shall be used from the fixed ladder or lower limit of the escape hoist to the shaft bottom.

55.19-112 through 55.19-119 [Reserved]

Inspection and Maintenance

55.19-120 *Mandatory.* A systematic procedure of inspection, testing, and maintenance of shafts and hoisting equipment shall be developed and followed. If it is found or suspected that any part is not functioning properly, the hoist shall not be used until the malfunction has been located and repaired or adjustments have been made.

55.19-121 *Mandatory.* Complete records shall be kept for three years of inspections, tests, and maintenance of shafts and hoisting equipment.

55.19-122 *Mandatory.* Parts used to repair hoists shall have properties that will insure the proper and safe function of the hoist.

55.19-123 *Mandatory.* Wire ropes shall be lubricated or treated with dressing as recommended or approved by the rope manufacturer.

55.19-124 *Mandatory.* Hoist ropes other than those on friction hoists shall be cut off at least six (6) feet above the highest connection to the conveyance at time intervals not to exceed one (1) year unless a shorter time is required by standard 55.19-126, or by conditions of use. The portion of the rope that is cut off shall be examined and inspected by a competent person for damage, corrosion, wear and fatigue.

55.19-125 *Mandatory.* Hoist ropes wound in multiple layers shall have a length cut off at the drum end at least three (3) times during the anticipated life of the rope and whenever necessary as required by standard 55.19-126 to distribute the wear at change-of-layer and crossover points. The length of rope cut off shall not be a whole number multiple of the circumference of the drum.

55.19-126 *Mandatory.* Hoist ropes shall be examined over the entire active length at least every month to evaluate wear and possible damage. When such examinations or other inspections reveal that the rope is worn, and at least every six (6) months, caliper measurements or nondestructive tests shall be made at the following locations:

(a) Wherever wear is evident;

(b) Immediately above the socket or clips and above the safety connection;

(c) Where the rope rests on the sheaves;

(d) Where the ropes leave the drums when the conveyances are at the regular stopping point;

(e) Where a layer of rope begins to overlap another layer on the drum; and

(f) At 100 foot intervals (measurements shall be made midway between the last previously calipered points).

55.19-127 [Reserved]

55.19-128 *Mandatory.* Ropes shall not be used for hoisting when they have:

(a) More than six broken wires in any lay;

(b) Crown wires worn to less than 65 percent of the original diameter;

(c) A marked amount of corrosion or distortion; and

(d) A combination of similar factors individually less severe than those above but which in aggregate might create an unsafe condition.

55.19-129 *Mandatory.* Hoistmen shall examine their hoists and shall test overtravel, deadman controls, position indicators, and braking mechanisms at the beginning of each shift.

55.19-130 *Mandatory.* Before hoisting persons and to assure that the hoisting compartments are clear of obstructions, empty hoist conveyances shall be operated at least one round trip after—

(a) Any hoist or shaft repairs or related equipment repairs that might restrict or obstruct conveyance clearance;

(b) Any oversize or overweight material or equipment trips that might restrict or obstruct conveyance clearance;

(c) Blasting in or near the shaft that might restrict or obstruct conveyance clearance; or

(d) Remaining idle for one shift or longer.

55.19-131 *Mandatory.* Hoist conveyance connections shall be inspected at least once during any 24-hour period that the conveyance is used for hoisting persons.

55.19-132 *Mandatory.* (a) A performance drop test of hoist conveyance safety catches shall be made at the time of installation, or prior to installation, in a mockup of the actual installation. The test shall be certified to in writing by the manufacturer or by a registered professional engineer performing the test.

(b) After installation and before use, and at the beginning of any seven (7) day period during which the conveyance is to be used, the conveyance shall be suitably rested and the hoist rope slackened to test for the unrestricted functioning of the safety catches and their activating mechanisms.

(c) The safety catches shall be inspected by a competent person at the beginning of any 24-hour period that the conveyance is to be used.

55.19-133 *Mandatory.* Shafts that have not been inspected within the past 7 days shall not be used until an inspection has been conducted by a competent person.

55.19-134 *Mandatory.* Sheaves in operating shafts shall be inspected weekly and kept properly lubricated.

55.19-135 *Mandatory.* Rollers used in operating inclined shafts shall be lubricated, properly aligned, and kept in good repair.

OMB Control No. 1219-0047, paragraph 55.19-57. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12504, July 31, 1969, as amended at 35 FR 3665, Feb. 25, 1970; 35 FR 18589, Dec. 8, 1970; 37 FR 14370, July 19, 1972; 39 FR 24317, July 1, 1974; 41 FR 23613, June 10, 1976; 42 FR 29419, June 8, 1977; 42 FR 57040, Oct. 31, 1977; 44 FR 31916, June 1, 1979; 44 FR 48520, Aug. 19, 1979; 44 FR 50571, Aug. 28, 1979; 44 FR 68828, Nov. 30, 1979; 47 FR 14706, Apr. 6, 1982]

§ 55.20 Miscellaneous.

55.20-1 *Mandatory.* Intoxicating beverages and narcotics shall not be permitted or used in or around mines. Persons under the influence of alcohol or narcotics shall not be permitted on the job.

55.20-2 *Mandatory.* An adequate supply of potable drinking water shall be provided at all active working areas.

(a) The common drinking cup and containers from which drinking water must be dipped or poured are prohibited.

(b) Where single service cups are supplied, a sanitary container for unused cups and a receptacle for used cups shall be provided.

(c) When water is cooled by ice, the ice shall either be of potable water or shall not come in contact with the water.

(d) Potable water outlets shall be posted.

(e) Potable water systems shall be constructed to prevent backflow or backsiphonage of non-potable water.

55.20-3 *Mandatory.* At all mining operations: (a) Workplaces, passageways, storerooms, and service rooms shall be kept clean and orderly. (b) The floor of every workplace shall be maintained in a clean and, so far as possible, a dry condition. Where wet processes are used, drainage shall be maintained, and false floors, platforms, mats, or other dry standing places shall be provided where practicable. (c) Every floor, working place, and passageway shall be kept free from protruding nails, splinters, holes, or loose boards, as practicable.

55.20-4 [Reserved]

55.20-5 *Mandatory.* Carbon tetrachloride shall not be used.

55.20-6 and 55.20-7 [Reserved]

55.20-8 *Mandatory.* (a) Toilet facilities shall be provided at locations that are compatible with the mine operations and that are readily accessible to mine personnel.

(b) The facilities shall be kept clean and sanitary. Separate toilet facilities shall be provided for each sex except where toilet rooms will be occupied by no more than one person at a time and can be locked from the inside.

55.20-9 *Mandatory.* Dusts suspected of being explosive shall be tested for explosibility. If tests prove positive, appropriate control measures shall be taken.

55.20-10 *Mandatory.* If failure of a water or silt retaining dam will create a hazard, it shall be of substantial construction and inspected at regular intervals.

55.20-11 *Mandatory.* Areas where health or safety hazards exist that are not immediately obvious to employees shall be barricaded, or warning signs shall be posted at all approaches. Warning signs shall be readily visible, legible, display the nature of the hazard, and any protective action required.

55.20-12 *Mandatory.* Toxic materials used in conjunction with or discarded from mining or milling of a product shall be plainly marked or labeled so as to positively identify the nature of the hazard and the protective action required.

55.20-13 *Mandatory.* Receptacles with covers shall be provided at suitable locations and used for the disposal of waste food and associated materials. They shall be emptied frequently and shall be maintained in a clean and sanitary condition.

55.20-14 *Mandatory.* No person shall be allowed to consume or store food or beverages in a toilet room nor in any area exposed to a toxic material.

[34 FR 12504, July 31, 1969, as amended at 35 FR 3665, Feb. 25, 1970; 42 FR 29420, June 8, 1977; 42 FR 57040, Oct. 31, 1977; 44 FR

48520, Aug. 17, 1979; 45 FR 68935, Oct. 17, 1980]

§ 55.22 Savings provision. [Reserved]

§ 55.26 Procedures.

NOTIFICATION OF COMMENCEMENT OF OPERATIONS AND CLOSING OF MINES

55.26-1 *Mandatory.* The owner, operator, or person in charge of any metal or nonmetal mine shall notify the nearest Mine Safety and Health Administration Metal and Nonmetal Mine Safety and Health Subdistrict office before starting operations, of the approximate or actual date mine operation will commence. The notification shall include the mine name, location, the company name, mailing address, person in charge, and whether operations will be continuous or intermittent.

When any mine is closed, the person in charge shall notify the nearest subdistrict office as provided above, and indicate whether the closure is temporary or permanent.

[38 FR 23380, Aug. 29, 1973, as amended at 43 FR 12318, Mar. 24, 1978]

PART 56—SAFETY AND HEALTH STANDARDS—SAND, GRAVEL, AND CRUSHED STONE OPERATIONS

Sec.

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56.19 Man hoisting.
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56.26 Procedures.

AUTHORITY: Secs. 301(a), 301(b)(2), 301(c)(3) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317-1319 (30 U.S.C. 961(a), (b)(2), (c)(3) (Supp. I, 1977)), and 29 U.S.C. 557a (Supp. I, 1977); sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 83 Stat. 803 (30 U.S.C. 957 (1976 ed.)); sec. 6 of the Federal Metal and Nonmetallic Mine Safety Act (repealed 1977), Pub. L. 89-577, 80 Stat. 774 (30 U.S.C. 725 (1976 ed.)), (repealed sec. 306(a), Pub. L. 95-164, 91 Stat. 1322, but see sec. 301(b)(1), Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961(b)(1) (Supp. I, 1977)); Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.), unless otherwise noted.

SOURCE: 34 FR 12511, July 31, 1969, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12318, Mar. 24, 1978.

OMB CONTROL No. 1219-0013 and 1219-0029. (47 FR 14706, Apr. 6, 1982)

§ 56.1 Purpose and scope.

The regulations in this part are promulgated pursuant to section 6 of the Federal Metal and Nonmetallic Mine Safety Act (30 U.S.C. 725) and prescribe health and safety standards for the purpose of the protection of life, the promotion of health and safety, and the prevention of accidents in sand (including industrial sands), gravel and crushed stone operations which are subject to that Act. Each standard which is preceded by the word "Mandatory" is a mandatory standard. The violation of a mandatory standard will subject an operator to an order or notice under section 8 of the Act (30 U.S.C. 727).

§ 56.2 Definitions.

As used in this part:

"American Table of Distances" means the current edition of "The American Table of Distances for Storage of Explosives" published by the Institute of Makers of Explosives.

"Approved" means tested and accepted for a specific purpose by a nationally recognized agency.

"Authorized person" means a person approved or assigned by mine management to perform a specific type of duty or duties or to be at a specific location or locations in the mine.

"Barricaded" means obstructed to prevent the passage of persons, vehicles, or flying materials.

"Berm" means a pile or mound of material capable of restraining a vehicle.

"Blasting agent" means any substance classified as a blasting agent by the Department of Transportation in 49 CFR § 173.114a (44 FR 31182, May 31, 1979) which is incorporated by reference. This document is available for inspection at each Metal and Nonmetal Safety and Health Subdistrict Office of the Mine Safety and Health Administration, and may be obtained from the U.S. Government Printing Office, Washington, D.C. 20402.

"Blasting area" means the area near blasting operations in which concussion or flying material can reasonably be expected to cause injury.

"Blasting cap" means a detonator which is initiated by a safety fuse.

"Blasting circuit" means the electrical circuit used to fire one or more electric blasting caps.

"Blasting switch" means a switch used to connect a power source to a blasting circuit.

"Booster" means any unit of explosive or blasting agent used for the purpose of perpetuating or intensifying an initial detonation.

"Capped fuse" means a length of safety fuse to which a blasting cap has been attached.

"Capped primer" means a package or cartridge of explosives which is specifically designed to transmit detonation to other explosives and which contains a detonator.

"Circuit breaker" means a device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent setting without injury to itself when properly applied within its rating.

"Combustible" means capable of being ignited and consumed by fire.

"Company official" means a member of the company supervisory or technical staff.

"Competent person" means a person having abilities and experience that fully qualify him to perform the duty to which he is assigned.

"Conductor" means a material, usually in the form of a wire, cable, or bus bar, capable of carrying an electric current.

"Delay connector" means a non-electric short interval delay device for use in delaying blasts which are initiated by detonating cord.

"Detonating cord" means a flexible cord containing a solid core of high explosives.

"Detonator" means any device containing a detonating charge that is used to initiate an explosive and includes but is not limited to blasting caps, electric blasting caps and nonelectric instantaneous or delay blasting caps.

"Distribution box" means a portable apparatus with an enclosure through which an electric circuit is carried to one or more cables from a single incoming feed line, each cable circuit being connected through individual overcurrent protective devices.

"Electric blasting cap" means a detonator designed for and capable of being initiated by means of an electric current.

"Electrical grounding" means to connect with the ground to make the earth part of the circuit.

"Employee" means a person who works for wages or salary in the service of an employer.

"Employer" means a person or organization which hires one or more persons to work for wages or salary.

"Explosive" means any substance classified as an explosive by the Department of Transportation in 49 CFR §§ 173.53, 173.88 and 173.100 which are incorporated by reference. Title 49 CFR is available for inspection at each Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration, and may be obtained from the U.S. Government Printing Office, Washington, D.C. 20402.

"Face or bank" means that part of any mine where excavating is progressing or was last done.

"Flammable" means capable of being easily ignited and of burning rapidly.

"Flash point" means the minimum temperature at which sufficient vapor is released by a liquid or solid to form a flammable vapor-air mixture at atmospheric pressure.

"Highway" means any public street, public alley, or public road

"High potential" means more than 650 volts.

"Hoist" means a power driven windlass or drum used for raising ore, rock, or other material from a mine, and for lowering or raising men and material.

"Igniter cord" means a fuse, cordlike in appearance, which burns progressively along its length with an external flame at the zone of burning, and is used for lighting a series of safety fuses in the desired sequence.

"Insulated" means separated from other conducting surfaces by a dielectric substance permanently offering a high resistance to the passage of current and to disruptive discharge through the substance. When any substance is said to be insulated, it is understood to be insulated in a manner suitable for the conditions to which it is subjected. Otherwise, it is, within the purpose of this definition, uninsulated. Insulating covering is one means for making the conductor insulated.

"Insulation" means a dielectric substance offering a high resistance to the passage of current and to a disruptive discharge through the substance.

"Lay" means the distance parallel to the axis of the rope in which a strand makes one complete turn about the axis of the rope.

"Low potential" means 650 volts or less.

"Magazine" means a facility for the storage of explosives, blasting agents, or detonators.

"Major electrical installation" means an assemblage of stationary electrical equipment for the generation, transmission, distribution, or conversion of electrical power.

"Man trip" means a trip on which men are transported to and from a work area.

"Mill" includes any ore mill, sampling works, concentrator, and any crushing, grinding, or screening plant used at, and in connection with, an excavation or mine.

"Misfire" means the complete or partial failure of a blasting charge to explode as planned.

"Multipurpose dry-chemical fire extinguisher" means a listed or approved multipurpose dry-chemical fire extinguisher having a minimum rating of 2-A:10-B:C, by Underwriters Laboratories, Inc., and containing a minimum of 4.5 pounds of dry-chemical agent.

"Non-electric delay blasting cap" means a detonator with an integral delay element and capable of being initiated by miniaturized detonating cord.

"Overburden" means material of any nature, consolidated or unconsolidated, that overlies a deposit of useful materials or ores that are to be mined.

"Overload" means that current which will cause an excessive or dangerous temperature in the conductor or conductor insulation.

"Permissible" means a machine, material, apparatus, or device that has been investigated, tested, and approved by the Bureau of Mines or the Mine Safety and Health Administration and maintained in permissible condition.

"Potable water" means water which shall meet the applicable minimum health requirements for drinking water established by the State or community in which the mine is located or by the Environmental Protection Agency in 40 CFR Part 141, pages 169-182 revised as of July 1, 1977. Where no such requirements are applicable, the drinking water provided shall conform with the Public Health Service Drinking Water Standards, 42 CFR Part 72, Subpart J, pages 527-533, revised as of October 1, 1976. Publications to which references are made in this definition are hereby made a part hereof. These incorporated publications are available for inspection at each Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration.

"Powder chest" means a substantial, nonconductive portable container equipped with a lid and used at blasting sites for explosives other than blasting agents.

"Primer" means a unit, package, or cartridge of explosives used to initiate other explosives or blasting agents, and which contains a detonator.

"Reverse-current protection" means a method or device used on direct-current circuits or equipment to prevent the flow of current in the reverse direction.

"Roll protection" means a framework, safety canopy or similar protection for the operator when equipment overturns.

"Safety can" means an approved container, of not over five gallons capacity, having a spring-closing lid and spout cover.

"Safety fuse" means a flexible cord containing an internal burning medium by which fire is conveyed at a continuous and uniform rate for the purpose of firing blasting caps or a black powder charge.

"Safety switch" means a sectionalizing switch that also provides shunt protection in blasting circuits between the blasting switch and the shot area.

"Scaling" means removal of insecure material from a face or high-wall.

"Secondary safety connection" means a second connection between a conveyance and rope, intended to prevent the conveyance from running away or falling in the event the primary connection fails.

"Shaft" means a vertical or inclined shaft, a slope, incline or winze.

"Short circuit" means an abnormal connection of relatively low resistance, whether made accidentally or intentionally, between two points of different potential in a circuit.

"Slurry" (as applied to blasting). See "Water gel."

"Stray current" means that portion of a total electric current that flows through paths other than the intended circuit.

"Substantial construction" means construction of such strength, material, and workmanship that the object will withstand all reasonable shock, wear, and usage, to which it will be subjected.

"Suitable" means that which fits, and has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstance.

"Travelway" means a passage, walk or way regularly used and designated for persons to go from one place to another.

"Trip light" means a light displayed on the opposite end of a train from the locomotive or engine.

"Water gel" or "Slurry" (as applied to blasting) means an explosive or blasting agent containing substantial portions of water.

"Wet drilling" means the continuous application of water through the central hole of hollow drill steel to the bottom of the drill hole.

"Working place" means any place in or about a mine where work is being performed.

[34 FR 12511, July 31, 1969, as amended at 35 FR 3666, Feb. 25, 1970; 35 FR 4515, Mar. 13, 1970; 37 FR 14368, July 19, 1972; 42 FR 29420, June 8, 1977; 42 FR 57041, Oct. 31, 1977; 43 FR 54066, Nov. 17, 1978; 44 FR 31916, June 1, 1979; 44 FR 48542, Aug. 17, 1979]

§ 56.3 Ground control.

56.3-1 *Mandatory.* Standards for the safe control of pit walls, including the overall slope of the pit wall, shall be established and followed by the operator. Such standards shall be consistent with prudent engineering design, the nature of the ground and the kind of material and mineral mined, and the insuring of safe working conditions according to the degree of slope. Mining methods shall be selected which will ensure wall and bank stability, including benching as necessary to obtain a safe overall slope.

56.3-2 *Mandatory.* Loose, unconsolidated material shall be stripped for a safe distance, but in no case less than 10 feet, from the top of pit or quarry walls, and the loose, unconsolidated material shall be sloped to the angle of repose.

56.3-3 *Mandatory.* To insure safe operation, the width and height of benches shall be governed by the type of equipment to be used and the operation to be performed.

56.3-4 *Mandatory.* Safe means for scaling pit-banks shall be provided. Hazardous banks shall be scaled before other work is performed in the hazardous bank area.

56.3-5 *Mandatory.* Men shall not work near or under dangerous banks. Overhanging banks shall be taken down immediately and other unsafe ground conditions shall be corrected promptly, or the areas shall be barricaded and posted.

56.3-6 *Mandatory.* Men shall approach from above loose rock and areas to be scaled and shall scale from a safe location.

56.3-7 [Reserved]

56.3-8 *Mandatory.* The supervisor, or a competent person designated by him, shall examine working areas and faces for unsafe conditions at least at the beginning of each shift and after blasting. Any unsafe condition found shall be corrected before any further work is performed at the immediate area or face at which the unsafe condition exists.

56.3-9 *Mandatory.* Men shall examine their working places before starting work and frequently thereafter, and any unsafe condition shall be corrected.

56.3-10 and 56.3-11 [Reserved]

56.3-12 *Mandatory.* Men shall not work between equipment and the pit wall or bank where the equipment may hinder escape from falls or slides of the bank.

56.3-13 through 56.3-49 [Reserved]

56.3-50 *Mandatory.* Material, other than hanging material, to be broken by secondary drilling and blasting, or by any other method shall be positioned or blocked to prevent hazardous movement before persons commence breaking operations. Persons who perform those operations shall work from a location where, if movement of material occurs, those persons will not be endangered.

56.3-51 *Mandatory.* Where manual scaling may be required at a work place, a scaling bar of sufficient length to place the user out of danger of falling material shall be provided. The scaling bar shall be blunt on the end held by the user. Picks or other short tools shall not be used for scaling when their use places the user in danger of falling material.

56.3-52 [Reserved]

56.3-53 *Mandatory.* When rock bolts are used as a means of ground support, anchorage test procedures shall be established and tests shall be conducted to determine the anchorage capacity of rock-bolt installations. Test results shall be in writing and made available to the Secretary or his duly authorized representative.

56.3-54 *Mandatory.* Rock bolts used as a means of ground support and which require torquing shall be torqued to a value within the range determined from information obtained by tests in the strata in which the rock-bolt assembly is used. In no case shall the applied torque cause a bolt tension that would exceed the yield point or anchorage capacity of the rock-bolt assembly being used.

56.3-55 *Mandatory.* When installing point-anchor rock bolts:

(a) A torque test shall be conducted on at least every fourth installed bolt.

(b) Torque testing shall be conducted immediately after bolt installation.

(c) If the recommended torque has not been achieved, the equipment used to install the bolt shall be adjusted and the next bolt installed shall then be tested.

(d) If the recommended torque has not been achieved on the majority of bolts installed in a working place through equipment adjustment, supplemental support equivalent to longer roof bolts with adequate anchorage, steel or wood sets, or cribs shall be installed.

56.3-56 *Mandatory.* Rock bolt hole drill bits shall be easily identifiable by sight or feel and diameters shall be within a tolerance of ±0.030 inches of the manufacturer's recommended hole diameter for the anchor used.

56.3-57 *Mandatory.* If used in rock-bolt assemblies to reduce friction between the bolt head and the bearing plate, washers shall: (a) Have hardness in the range of 35-45 HRC (Hardness Rockwell C Scale). (b) Conform to the shape of the bolt head and bearing plate. (c) Have sufficient strength to withstand loads up to the yield point of the rock bolt.

OMB CONTROL No. 1219-0035, paragraph 56.3-53. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12511, July 31, 1969, as amended at 35 FR 3666, Feb. 25, 1970; 35 FR 18589, Dec. 8, 1970; 42 FR 29420, June 8, 1977; 42 FR 57041, Oct. 31, 1977; 44 FR 48520, Aug. 17, 1979; 47 FR 14706, Apr. 6, 1982]

§ 56.4 Fire prevention and control.

56.4-1 *Mandatory.* No person shall smoke or use an open flame—

(a) Where flammable solvents, liquids, fluids, or other flammable materials are stored, transported, handled, or used; or

(b) Where oil or grease is stored, transported, handled, or used, if smoking or the use of an open flame may cause a fire; or

(c) Within an unsafe distance of any area where smoking or the use of an open flame may cause a fire or an explosion.

56.4-2 *Mandatory.* Signs warning against smoking and open flames shall be posted so they can be readily seen in areas or places where fire or explosion hazards exist.

56.4-3 *Mandatory.* Areas surrounding electric substations and unburied tanks used for the storage of flammable or combustible liquids shall be free of combustible materials (including dry vegetation) for a distance of at least 25 feet.

56.4-4 *Mandatory.* Flammable liquids shall be stored in accordance with standards of the National Fire Protection Association or other recognized agencies approved by the Mine Safety and Health Administration. Small quantities of flammable liquids drawn from storage shall be kept in appropriately labeled safety cans.

56.4-5 *Mandatory.* Effective February 13, 1980, fixed unburied tanks used for the storage of flammable or combustible liquids shall be securely mounted on firm foundations. Where necessary to prevent leaks caused by tanks settling, piping shall be provided with flexible connections or other special fittings.

56.4-6 [Reserved]

56.4-7 *Mandatory.* Means shall be provided to remove or control spilled flammable or combustible liquids.

56.4-8 *Mandatory.* Fuel lines shall be equipped with valves to cut off fuel at the source and shall be located and maintained to minimize fire hazards.

56.4-9 *Mandatory.* All heat sources, including lighting equipment, capable of producing combustion shall be insulated or isolated from combustible materials.

56.4-10 *Mandatory.* Power wires and cables shall be adequately insulated where they pass through doors or walls or where they present a fire hazard.

56.4-11 *Mandatory.* Abandoned electrical circuits shall be deenergized and isolated so that they cannot become energized inadvertently.

56.4-12 *Mandatory.* All flammable and combustible waste materials, grease, lubricants or flammable liquids shall not be allowed to accumulate where they can create a fire hazard.

56.4-13 *Mandatory.* In areas where materials such as oily waste or oily rags create a fire hazard, the materials shall be placed in covered metal containers until disposed of properly.

56.4-14 *Mandatory.* Solvents with flash points lower than 100° F. (38° C.) shall not be used for cleaning.

56.4-15 *Mandatory.* Solvents shall not be used near an open flame or other ignition source, or near any source of heat, or in an atmosphere that can elevate the temperature of the solvent above the flash point.

56.4-16 *Mandatory.* Drip pans shall be provided to catch leakage or spillage whenever combustible or flammable liquids are dispensed in a place or manner which may create a fire hazard. Floor areas where drip pans are used shall be cleaned immediately after spills.

56.4-17 [Reserved]

56.4-18 *Mandatory.* Oxygen cylinders shall not be stored in rooms or areas used or designated for oil or grease storage.

56.4-19 *Mandatory.* Gauges and regulators used with oxygen or acetylene cylinders shall be kept clean and free of oil and grease.

56.4-20 *Mandatory.* Battery-charging stations shall be located in well-ventilated areas.

56.4-21 *Mandatory.* Equipment powered by internal combustion engines (except diesel engines), where the fuel tank is an integral part of the equipment, shall be shut off and stopped before being fueled.

56.4-22 *Mandatory.* Each mine shall have available or be provided with suitable fire-fighting equipment adequate for the size of the mine.

56.4-23 *Mandatory.* Fire fighting equipment which is provided on the mine property shall be strategically located, readily accessible, plainly marked, properly maintained, and inspected periodically. Records shall be kept of such inspections.

56.4-24 *Mandatory.* Fire extinguishers and fire suppression devices shall be:

(a) Of the appropriate type for the particular fire hazard involved.

(b) Adequate in number and size for the particular fire hazard involved.

(c) Replaced with a fully charged extinguisher or device, or recharged immediately, after any discharge is made from the extinguisher or device.

(d) Inspected, tested, and maintained at regular intervals according to the manufacturer's recommendations.

(e) Approved by the Underwriter's Laboratories, Inc., or other competent testing agency acceptable to the Mine Safety and Health Administration.

56.4-25 *Mandatory.* Effective February 13, 1980, whenever fire hydrants are used, they shall be provided with—

(a) Uniform fittings;

(b) Readily available wrenches or keys to open the valves; and

(c) Readily available adapters that connect hydrant fittings to the hose equipment of local fire departments.

56.4-26 *Mandatory.* Water pipes, valves, outlets, hydrants, and hoses designated for fire fighting purposes shall be inspected every 90 days and tested annually.

56.4-27 *Mandatory.* Whenever self-propelled mobile equipment is used, such equipment shall be provided with a suitable fire extinguisher readily accessible to the equipment operator

56.4-28 *Mandatory.* Welding, cutting, arc welding or soldering shall be performed by a competent person.

56.4-29 *Mandatory.* When welding or cutting, suitable precautions shall be taken to insure that smoldering metal or sparks do not result in a fire. Fire extinguishing equipment shall be immediately available at the site.

56.4-30 through 56.4-32 [Reserved]

56.4-33 *Mandatory.* Valves on oxygen and acetylene tanks shall be kept closed when the contents are not being used.

56.4-34 [Reserved]

56.4-35 *Mandatory.* Before any heat is applied to pipelines or containers which have contained flammable or combustible substances, they shall be drained, ventilated, thoroughly cleaned of residual substances and filled with either an inert gas or, where compatible, filled with water.

56.4-36 through 56.4-38 [Reserved]

56.4-39A *Mandatory.* Effective February 13, 1980,storage buildings or rooms in which flammable or combustible liquids or other flammable materials are stored and which are within 100 feet of where miners normally work shall be well-ventilated and constructed of materials having a fire-resistance rating of no less than one (1) hour as *tested under the appropriate National Fire* Protection Association (NFPA) fire-resistance test or under a test of another approved testing agency.

56.4-39B *Mandatory.* Emergency fire fighting plans in combination with evacuation and rescue plans shall be established and coordinated with available fire fighting organizations. Emergency fire fighting drills shall be held for each shift at least once every six (6) months.

56.4-39C through 56.4-39Z [Reserved]

56.4-40 *Mandatory.* Fire alarm systems shall be provided and maintained in operating condition or adequate fire alarm procedures shall be established to warn promptly all persons endangered by a fire.

56.4-41 *Mandatory.* Every building or structure where persons normally work shall be provided with exits sufficient to permit the prompt escape of persons in case of fire.

56.4-42 through 56.4-46 [Reserved]

56.4-47 *Mandatory.* Belt conveyors shall be equipped with a safety switch capable of automatically stopping the drive pulley in the event of excessive slippage of the belt, where ignition of the belt could create a hazard to personnel. When it is necessary to operate the conveyor while temporarily bypassing the safety switch or any automatic function of the switch, a person shall attend the belt at the drive pulley.

56.4-48 *Mandatory.* All employees shall be instructed at least once each calendar year on fire alarm signals and applicable procedures to be followed in case of fire or other emergency. Records of instruction shall be kept for 2 years.

56.4-49 [Reserved]

OMB CONTROL No. 1291-0062, paragraph 56.4-48. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12511, July 31, 1969, as amended at 35 FR 3666, Feb. 25, 1970; 35 FR 18589, Dec. 8, 1970; 37 FR 14371, July 19, 1972; 38 FR 23381, Aug. 29, 1973; 41 FR 23614, June 10, 1976; 41 FR 28266, July 9, 1976; 44 FR 48520, Aug. 17, 1979; 47 FR 14706, Apr. 1, 1982]

§ 56.5 Air quality and physical agents.

AIR QUALITY

56.5-1 *Mandatory.* Except as permitted by section 56.5-5:

(a) Except as provided in paragraph (b), the exposure to airborne contaminants shall not exceed, on the basis of a time weighted average, the threshold limit values adopted by the American Conference of Governmental Industrial Hygienists, as set forth and explained in the 1973 edition of the Conference's publication, entitled "TLV's Threshold Limit Values for Chemical Substances in Workroom Air Adopted by ACGIH for 1973," pages 1 through 54, which are hereby incorporated by reference and made a part hereof. This publication may be obtained from the American Conference of Governmental Industrial Hygienists by writing to the Secretary-Treasurer, P.O. Box 1937, Cincinnati, Ohio 45201, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration. Excursions above the listed thresholds shall not be of a greater magnitude than is characterized as permissible by the Conference.

(b) The 8-hour time-weighted average airborne concentration of asbestos dust to which employees are exposed shall not exceed 2 fibers per milliliter greater than 5 microns in length, as determined by the membrane filter method at 400-450 magnification (4 millimeter objective) phase contrast illumination. No employees shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers longer than 5 micrometers, per milliliter of air, as determined by the membrane filter method over a minimum sampling time of 15 minutes. "Asbestos" is a generic term for a number of hydrated silicates that, when crushed or processed, separate into flexible fibers made up of fibrils. Although there are many asbestos minerals, the term "asbestos" as used herein is limited to the following minerals: chrysotile, amosite, crocidolite, anthophylite asbestos, tremolite asbestos, and actinolite asbestos.

(c) Employees shall be withdrawn from areas where there is present an airborne contaminant given a "C" designation by the Conference and the concentration exceeds the threshold limit value listed for that contaminant.

56.5-2 *Mandatory.* Dust, gas, mist, and fume surveys shall be conducted as frequently as necessary to determine the adequacy of control measures.

56.5-3 *Mandatory.* Holes shall be collared and drilled wet, or other efficient dust control measures shall be used when drilling non-water-soluble material. Efficient dust control measures shall be used when drilling water-soluble materials.

56.5-4 [Reserved]

56.5-5 *Mandatory.* Control of employee exposure to harmful airborne contaminants shall be, insofar as feasible, by prevention of contamination, removal by exhaust ventilation, or by dilution with uncontaminated air. However, where accepted engineering control measures have not been developed or when necessary by the nature of work involved (for example, while establishing controls or occasional entry into hazardous atmospheres to perform maintenance or investigation), employees may work for reasonable periods of time in concentrations of airborne contaminants exceeding permissible levels if they are protected by appropriate respiratory protective equipment. Whenever respiratory protective equipment is used a program for selection, maintenance, training, fitting, supervision, cleaning, and use shall meet the following minimum requirements:

(a) Mine Safety and Health Administration approved respirators which are applicable and suitable for the purpose intended shall be furnished, and employees shall use the protective equipment in accordance with training and instruction.

(b) A respirator program consistent with the requirements of ANSI Z88.2-1969, published by the American National Standards Institute and entitled "American National Standards Practices for Respiratory Protection ANSI Z88.2 1969," approved August 11, 1969, which is hereby incorporated by reference and made a part hereof. This publication may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration.

(c) When respiratory protection is used in atmospheres immediately harmful to life, the presence of at least one other person with backup equipment and rescue capability shall be required in the event of failure of the respiratory equipment.

56.5-6 *Mandatory.*The following chemical substances shall not be used or stored except by competent persons under laboratory conditions approved by a nationally recognized agency acceptable to the Secretary.

(a) Carbon tetrachloride,
(b) Phenol,
(c) 4-Nitrobiphenyl,
(d) Alpha-naphthylamine,
(e) 4,4-Methylene Bis (2-chloroaniline),
(f) Methyl-chloromethyl ether,
(g) 3,3 Dichlorobenzidine,
(h) Bis (chloromethyl) ether,
(i) Beta-napthylamine,
(j) Benzidine,
(k) 4-Aminodiphenyl,
(l) Ethyleneimine,
(m) Beta-propiolactone,
(n) 2-Acetylaminofluorene,
(o) 4-Dimethylaminobenzene, and
(p) N-Nitrosodimethylamine.

56.5-7 through 56.5-9 [Reserved]

56.5-10 *Mandatory.* Silica sand, or other materials containing more that 1 percent free silica, shall not be use as an abrasive substance in abrasive blasting cleaning operations without requiring full-flow respiratory protection, or equivalent, to all exposed persons.

56.5-11 through 56.5-49 [Reserved]

PHYSICAL AGENTS

56.5-50 *Mandatory.* (a) No employee shall be permitted an exposure to noise in excess of that specified in the table below. Noise level measurements shall be made using a sound level meter meeting specifications for type 2 meters contained in American National Standards Institute (ANSI) Standard S1.4-1971, "General Purpose Sound Level Meters," approved April 27, 1971, which is hereby incorporated by reference and made a part hereof, or by a dosimeter with similar accuracy. This publication may be obtained from the American National Standards Institute, Inc. 1430 Broadway, New York, New York 10018, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration.

PERMISSIBLE NOISE EXPOSURES

Duration per day, hours of exposure	Sound level dBA, slow response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

No exposure shall exceed 115 dBA. Impact or impulsive noises shall not exceed 140 dB, peak sound pressure level.

NOTE: When the daily noise exposure is composed of two or more periods of noise exposure at different levels, their combined effect shall be considered rather than the individual effect of each.

If the sum

$$(C_1/T_1)+(C_2/T_2)+\ .\ .\ .\ (C_n/T_n)$$

exceeds unity, then the mixed exposure shall be considered to exceed the permissible exposure. C_n indicates the total time of exposure at a specified noise level, and T_n indicates the total time of exposure permitted at that level. Interpolation between tabulated values may be determined by the following formula:

$$\text{Log } T = 6.322 - 0.0602\ SL$$

Where T is the time in hours and SL is the sound level in dBA.

(b) When employees' exposure exceeds that listed in the above table, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce exposure to within permissible levels, personal protection equipment shall be provided and used to reduce sound levels to within the levels of the table.

OMB CONTROL No. 1219-0048, paragraph 56.5-5. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12511, July 31, 1969, as amended at 35 FR 3667, Feb. 25, 1970; 35 FR 18590 Dec. 8, 1970; 39 FR 24318, July 1, 1974; 39 FR 28433, Aug. 7, 1974; 41 FR 23614, June 10, 1976; 43 FR 54066, Nov. 17, 1978; 44 FR 36385, June 22, 1979; 44 FR 48521, Aug. 17, 1979; 47 FR 14706, Apr. 6, 1982]

§ 56.6 Explosives.

The term "explosives" as used in this § 56.6 includes blasting agents. The standards in this section in which the term "explosives" appears are applicable to blasting agents (as well as to other explosives) unless blasting agents are expressly excluded.

STORAGE

56.6-1 *Mandatory.* Detonators and explosives other than blasting agents shall be stored in magazines.

56.6-2 *Mandatory.* Detonators shall not be stored in the same magazine with explosives.

56.6-3 and 56.6-4 [Reserved]

56.6-5 *Mandatory.* Areas surrounding magazines and facilities for the storage of blasting agents shall be kept clear of rubbish, brush, dry grass, or trees (other than live trees 10 or more feet tall), for a distance not less than 25 feet in all directions, and other unnecessary combustible materials for a distance of not less than 50 feet.

56.6-6 [Reserved]

56.6-7 *Mandatory.* Explosives, detonators, and related materials such as safety fuse and detonating cord shall be:

(a) Stored in a manner to facilitate use of oldest stocks first.

(b) Stored according to brand and grade in such a manner as to facilitate identification.

(c) Stored with their top sides up.

(d) Stacked in a stable manner but not more than eight (8) feet high.

56.6-8 *Mandatory.* Ammonium nitrate-fuel oil blasting agents shall be physically separated from other explosives, safety fuse, or detonating cord stored in the same magazine and in such a manner that oil does not contaminate the other explosives, safety fuse, or detonating cord.

56.6-9 and 56.6-10 [Reserved]

56.6-11 *Mandatory.* Containers of explosives, blasting agents, and detonators shall be closed while being stored.

56.6-12 *Mandatory.* Prior to interior repair of facilities for storage of explosives, including blasting agents, all materials stored within the facility shall be removed and the interior cleaned. Prior to the exterior repair of such facilities, all materials stored within the facility shall be removed if there exists a possibility that such repairs may produce a spark or flame. The explosives removed from storage facilities to be repaired shall be placed either in other storage facilities appropriate for the storage of such materials under this section or a safe distance from the facilities under repair where they shall be properly guarded and protected until the repairs have been completed and the materials have been returned to storage within the facilities.

56.6-13 through 56.6-19 [Reserved]

56.6-20 *Mandatory.* Magazines shall be:

(a) Located in accordance with the current American Table of Distances for storage of explosives.

(b) Detached structures located away from powerlines, fuel storage areas, and other possible sources of fire.

(c) Constructed substantially of noncombustible material or covered with fire-resistant material.

(d) Reasonably bullet resistant.

(e) Electrically bonded and grounded if constructed of metal.

(f) Made of nonsparking materials on the inside, including floors.

(g) Provided with adequate and effectively screened ventilation openings near the floor and ceiling.

(h) Kept locked securely when unattended.

(i) Posted with suitable danger signs so located that a bullet passing through the face of a sign will not strike the magazine.

(j) Used exclusively for storage of explosives or detonators and kept free of all extraneous materials.

(k) Kept clean and dry in the interior, and in good repair.

(l) Unheated, unless heated in a manner that does not create a fire or explosion hazard. Electrical heating devices shall not be used inside a magazine.

56.6-21 through 56.6-39 [Reserved]

TRANSPORTATION

56.6-40 *Mandatory.* Explosives and detonators shall be transported in separate vehicles unless separated by 4 inches of hard wood or the equivalent.

56.6-41 *Mandatory.* When explosives and detonators are hauled by trolley locomotive, covered, electrically insulated cars shall be used.

56.6-42 *Mandatory.* Self-propelled vehicles used to transport explosives or detonators shall be equipped with suitable fire extinguishers.

56.6-43 *Mandatory.* Vehicles containing explosives or detonators shall be posted with proper warning signs.

56.6-44 *Mandatory.* When vehicles containing explosives or detonators are parked, the brakes shall be set, the motive power shut off, and the vehicle shall be blocked securely against rolling.

56.6-45 *Mandatory.* Vehicles containing explosives or detonators shall not be taken to a repair garage or shop for any purpose.

56.6-46 *Mandatory.* Vehicles containing explosives or detonators shall be mainained in good condition and shall be operated at a safe speed and in accordance with all safe operating practices.

56.6-47 *Mandatory.* Vehicles used to transport explosives, other than blasting agents, shall have substantially constructed bodies, no sparking metal exposed in the cargo space, and shall be equipped with suitable sides and tail gates; explosives shall not be piled higher than the side or end enclosures.

56.6-48 *Mandatory.* Explosives and blasting agents shall be transported without undue delay, and over routes and at times that expose a minimum number of persons.

56.6-49 [Reserved]

56.6-50 *Mandatory.* Other materials or supplies shall not be placed on or in the cargo space of a conveyance containing explosives, detonating cord or detonators, except for safety fuse and except for properly secured, nonsparking equipment used expressly in the handling of such explosives, detonating cord or detonators.

56.6-51 *Mandatory.* Explosives or detonators shall not be transported on locomotives.

56.6-52 [Reserved]

56.6-53 *Mandatory.* Only the necessary attendants shall ride on or in vehicles containing explosives or detonators.

56.6-54 *Mandatory.* Explosives or detonators shall not be transported on man-trips.

56.6-55 [Reserved]

56.6-56 *Mandatory.* Substantial nonconductive containers shall be used to carry explosives to blasting sites.

56.6-57 *Mandatory.* Nonconductive containers with tight-fitting covers shall be used to transport or carry capped fuses and electric detonators to blasting sites.

56.6-58 through 56.6-64 [Reserved]

56.6-65 *Mandatory.* Vehicles containing detonators or explosives, other than blasting agents, shall not be left unattended except in blasting areas where loading or charging is in progress.

56.6-66 through 56.6-89 [Reserved]

Use

56.6-90 *Mandatory.* Persons who use or handle explosive or detonators shall be experienced men who understand the hazards involved; trainees shall do such work only under the supervision of and in the immediate presence of experienced men.

56.6-91 *Mandatory.* Blasting operations shall be under the direct control of authorized persons.

56.6-92 *Mandatory.* Damaged or deteriorated explosives and blasting agents shall be destroyed in a safe manner under the instructions of the explosives or blasting agent manufacturer or its designated agent.

56.6-93 *Mandatory.* Boreholes shall be cleared of obstructions before charging.

56.6-94 *Mandatory.* Holes to be blasted shall be charged as near to blasting time as practical and such holes shall be blasted as soon as possible after charging has been completed. In no case shall the time elapsing between the completion of charging to the time of blasting exceed 72 hours unless prior approval has been obtained from the Mine Safety and Health Administration.

56.6-95 [Reserved]

56.6-96 *Mandatory.* Explosives shall be kept separated from detonators until charging is started.

56.6-97 *Mandatory.* Primers shall be made up only at the time of use and as close to the blasting area as conditions allow.

56.6-98 *Mandatory.*

(a) Primers containing a detonator shall be prepared with the detonator contained securely and completely within the explosive charge or within a suitable tunnel or cap well.

(b) When using detonating cord to initiate another explosive, a connection shall be prepared with the detonating cord threaded through, attached securely to, or otherwise in intimate contact with the explosive charge.

56.6-99 *Mandatory.* Only wooden or other nonsparking implements shall be used to punch holes in an explosive cartridge.

56.6-100 *Mandatory.* Tamping poles shall be of wood or other material acceptable to the Mine Safety and Health Administration. Couplers of tamping poles shall be of nonsparking materials.

56.6-101 *Mandatory.* Tamping shall not be done directly on a primer.

56.6-102 *Mandatory.* Unused explosives and detonators shall be moved to a safe location as soon as charging operations are completed.

56.6-103 *Mandatory.* Areas in which charged holes are awaiting firing shall be guarded, or barricaded and posted, or flagged against unauthorized entry.

56.6-104 *Mandatory.* When safety fuse has been used, men shall not return to misfired holes for at least 30 minutes.

56.6-105 *Mandatory.* When electric blasting caps have been used, men shall not return to misfired holes for at least 15 minutes.

56.6-106 *Mandatory.* Faces and muck piles shall be examined by a competent person for undetonated explosives or blasting agents and any undetonated explosives or blasting agents found shall be disposed of safely.

56.6-107 *Mandatory.* Holes shall not be drilled where there is danger of intersecting a charged or misfired hole.

56.6-108 *Mandatory.* Fuse and igniters shall be stored in a cool, dry place away from oils or grease.

56.6-109 *Mandatory.* Safety fuse, igniter cord, and detonating cord shall not be used if they have been kinked, bent sharply, or otherwise damged.

56.6-110 *Mandatory.* Fuses shall be cut and capped in safe, dry locations posted with "No Smoking" signs.

56.6-111 *Mandatory.* Blasting caps shall be crimped to fuses only with implements designed for that specific purpose.

56.6-112 *Mandatory.* The burning rate of the safety fuse in use at any time shall be measured, posted in conspicuous locations, and brought to the attention of all men concerned with blasting.

56.6-113 *Mandatory.* When firing from 1 to 15 blastholes with safety fuse ignited individually using hand-held lighters, the fuses shall be of such lengths to provide the minimum burning time specified in the following table for a particular size round:

Number of holes in a round	Minimum burning time, minutes
1	2
2-5	2⅔
6-10	3⅓
11-15	5

In no case shall any 40-second-per-foot safety fuse less than 36 inches long or any 30-second-per-foot safety fuse less than 48 inches long be used.

56.6-114 *Mandatory.* At least two men shall be present when lighting fuses, and no man shall light more than 15 individual fuses. If more than 15 holes per man are to be fired, igniter cord and connectors or electric blasting shall be used.

56.6-115 *Mandatory.* All detonating cord knots shall be tight and all connections shall be kept at right angles to the trunklines.

56.6-116 *Mandatory.* Fuse shall be ignited with hot-wire lighters, lead spitters, igniter cord, or other such devices designed for this purpose. Carbide lights shall not be used to light fuses.

56.6-117 *Mandatory.* Fuse shall not be ignited before the primer and the entire charge are securely in place.

56.6-118 *Mandatory.* When using safety fuse, where fly rock might damage unlit or burning fuses, timing shall be such that all fuses are burning within the holes before any hole detonates.

56.6-119 *Mandatory.* Electric detonators of different brands shall not be used in the same round.

56.6-120 *Mandatory.* Except when being tested with a blasting galvanometer:

(a) Electric detonators shall be kept shunted until they are being connected to the blasting line or wired into a blasting round.

(b) Wired rounds shall be kept shunted until they are being connected to the blasting line.

(c) Blasting lines shall be kept shunted until immediately before blasting.

56.6-121 *Mandatory.* When blasting electrically a blasting galvanometer, or other instrument that is specifically designed for testing blasting circuits, shall be used to test:

(a) In surface operations:

(1) Continuity of each electric blasting cap in the borehole prior to the addition of stemming.

(2) Resistance of individual series or the resistance of multiple balanced series to be connected in parallel prior to their connection to the blasting line.

(3) Continuity of blasting lines prior to the connection of electric blasting cap series.

(4) Total blasting circuit resistance prior to connection to the power source.

(b) In underground operations:

(1) Continuity of each electric blasting cap series.

(2) Continuity of blasting lines prior to the connection of electric blasting caps.

56.6-122 *Mandatory.* Permanent blasting lines shall be properly supported, insulated, and kept in good repair.

56.6-123 *Mandatory.* When electric detonators are used, charging shall be stopped immediately when the presence of static electricity or stray currents is detected; the condition shall be remedied before charging is resumed.

56.6-124 *Mandatory.* When electric detonators are used, charging shall be suspended in surface mining, shaft sinking, and tunneling and men withdrawn to a safe location upon the approach of an electrical storm.

56.6-125 *Mandatory.* If branch circuits are used when blasts are fired from power circuits, safety switches located at safe distances from the blast areas shall be provided in addition to the main blasting switch.

56.6-126 *Mandatory.* Electric power distribution circuits shall be de-energized within 50 feet of boreholes containing electric blasting caps which can be initiated by conventional power sources or extraneous electricity except that such circuits need not be de-energized between 25 and 50 feet of such boreholes when stray current tests, conducted as frequently as necessary, measure a maximum stray current less than 0.05 amperes through a one-ohm resistor measured at the location of the electric blasting cap.

56.6-127 *Mandatory.* Blasting switches shall be locked in the open position, except when closed to fire the blast. Lead wires shall not be connected to the blasting switch until the shot is ready to be fired.

56.6-128 *Mandatory.* The key or other control to an electrical firing device shall be entrusted only to the person designated to fire the round or rounds.

56.6-129 *Mandatory.* Electric circuits from the blasting switches to the blast area shall not be grounded.

56.6-130 *Mandatory.* At least a 15-foot air gap shall be provided between the blasting circuit and the electric power source.

56.6-131 *Mandatory.* Power sources shall be suitable for the number of electric detonators to be fired and for the type of circuits used.

56.6-132 *Mandatory.* Delay connectors shall be treated and handled with the same safety precautions as detonators.

56.6-133 *Mandatory.* If any part of a blast is connected in parallel and is to be initiated from powerlines or lighting circuits, the time of current flow shall be limited to a maximum of 25 milliseconds by incorporating an arcing control device in the blasting circuit or by interrupting the circuit with an explosive charge attached to one or both lead lines and initiated by a zero-delay electric blasting cap.

56.6-134 *Mandatory.* Tools used for opening metal or nailed wooden containers of explosives or detonators shall be of nonsparking materials.

56.6-135 *Mandatory.* Holes shall not be collared in bootlegs.

56.6-136 *Mandatory.* Black powder shall not be used for blasting except when a desired result cannot be obtained with another type of explosive such as in quarrying certain types of dimension stone.

56.6-137 *Mandatory.* In the use of black blasting powder:

(a) Containers shall not be opened in, or within 50 feet of, any magazine; within any building in which a fuel-fired or exposed-element electric heater is in operation; where electrical or incandescent-particle sparks could result in powder ignition; or within 50 feet of any open flame.

(b) Granular powder shall be transferred from containers only by pouring.

(c) Spills of granular powder shall be cleaned up promptly with nonsparking equipment: contaminated powder shall be put into a container of water and its content disposed of promptly after the granules have disintegrated, or the spill area shall be flushed with a copious amount of water to completely disintegrate the granules.

(d) Containers of powder shall be kept securely closed at all times other than when the powder is being transferred from or into a container.

(e) Containers of powder transported by vehicles shall be in a wholly enclosed cargo space.

(f) Misfires shall be disposed of by: (1) washing the stemming and powder charge from the borehole, and (2) removal and disposal of the initiator as a damaged explosive.

(g) Boreholes of shots that fire but fail to break or fail to break properly, shall not be recharged for at least 12 hours.

56.6-138 *Mandatory.* Explosives or blasting agents shall not be loaded into drilled or sprung holes that could result in premature detonation from heat.

56.6-139 *Mandatory.* Blasting areas shall not be re-entered after firing until concentrations of smoke, dust, and fumes have been reduced to safe limits as required in, and determined by, mandatory standards 56.5-1 and 56.5-2, respectively.

56.6-140 *Mandatory.* Blasting circuits and electric blasting caps (which are capable of being initiated by conventional power sources) shall be protected from sources of extraneous electricity.

56.6-141 [Reserved]

56.6-142 *Mandatory.* Explosives or blasting agents shall not be loaded into boreholes through or with either drill stem equipment or other devices which could be extracted while containing explosives or blasting agents. The use of loading hose, collar sleeves or collar pipes is permitted.

56.6-143 through 56.6-158 [Reserved]

56.6-159 *Mandatory.* Powder chests shall be:

(a) Substantially constructed of nonsparking material on the inside.

(b) Posted with suitable warning signs.

(c) Located out of the blast area and out of the line of blasts.

(d) Emptied and their contents returned to the main magazine at the end of each shift unless the powder chest is located within the area continually attended by employees during shift changes.

(e) Separate for detonators and explosives unless separated by 4 inches of hard wood or the equivalent.

(f) Kept locked when unattended.

56.6-160 *Mandatory.* Ample warning shall be given before blasts are fired. All persons shall be cleared and removed from the blasting area unless suitable blasting shelters are provided to protect men endangered by concussion or flyrock from blasting.

56.6-161 *Mandatory.* If explosives are suspected of burning in a hole, all persons in the endangered area shall move to a safe location and no one shall return to the hole until the danger has passed, but in no case within 1 hour.

56.6-162 *Mandatory.* Lead wires and blasting lines shall not be strung across power conductors, pipelines, railroad tracks, or within 20 feet of bare powerlines. They shall be protected from sources of static or other electrical contact.

56.6-163 *Mandatory.* The double-trunkline or loop system shall be used in detonating-cord blasting.

56.6-164 *Mandatory.* Trunklines, in multiple-row blasts, shall make one or more complete loops, with crossties between loops at intervals of not over 200 feet.

56.6-165 through 56.6-167 [Reserved]

56.6-168 *Mandatory.* Misfires shall be reported to the proper supervisor and shall be disposed of safely before any other work is performed in that blasting area.

56.6-169 through 56.6-189 [Reserved]

SENSITIZED AMMONIUM NITRATE BLASTING AGENTS

All of the standards in this § 56.6 in which the term "explosives" appears are applicable to blasting agents (as well as to other explosives) unless blasting agents are expressly excluded.

56.6-190 through 56.6-192 [Reserved]

56.6-193 *Mandatory.* Where pneumatic loading is employed, before any type of blasting operation using blasting agents is put into effect, an evaluation of the potential hazard of static electricity shall be made. Adequate steps, including the grounding and bondind of the conductive parts of pneumatic loading equipment, shall be taken to eiminate the hazard of static electricity before blasting use is commenced.

56.6-194 [Reserved]

56.6-195 *Mandatory.* Hoses used in connection with pneumatic loading machines shall be of the semiconductive type, having a total resistance low enough to permit the dissipation of static electricity and high enough to limit the flow of stray electric currents to a safe level. Wire-countered hose shall not be used because of the potential hazard from stray electric currents.

56.6-196 and 56.6-197 [Reserved]

56.6-198 *Mandatory.* Plastic tubes shall not be used as hole liners if blasting agents are loaded pneumatically into holes containing an electric detonator.

56.6-199 [Reserved]

56.6-200 *Mandatory.* Vehicles used to transport blasting agents shall have substantially constructed bodies, no zinc or copper exposed in the cargo space and shall be freely vented. Blasting agents shall not be piled higher than the side or end enclosures of open-body vehicles. If an enclosed screw conveyor is used to discharge blasting agents from the vehicle the conveyor shall be protected against excessive internal pressure and excessive frictional heat.

56.6-201 through 56.6-249 [Reserved]

MISCELLANEOUS

56.6-250 *Mandatory.* Smoking and open flames, except for the use of suitable devices for igniting safety fuse or the use of approved heating devices, shall not be permitted within 50 feet as measured by the line of sight of explosives, blasting agents, or detonators or within 25 feet when out of line of sight and separated by permanent noncombustible barriers in underground active workings.

(Sec. 101, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811), and sec. 301(c)(3), Pub. L. 95-164, 91 Stat. 1318 (30 U.S.C. 961(c)(3))

[34 FR 12511, July 31, 1969; 34 FR 12947, Aug. 9, 1969, as amended at 35 FR 3667, Feb. 25, 1970; 37 FR 14368, July 19, 1972; 39 FR 24318, July 1, 1974; 41 FR 23614, June 10, 1976; 41 FR 33263, Aug. 9, 1976; 44 FR 48521, 48543, Aug. 17, 1979; 44 FR 53703, Sept. 14, 1979]

§ 56.7 Drilling.

56.7-1 [Reserved]

56.7-2 *Mandatory.* Equipment defects affecting safety shall be corrected before the equipment is used.

56.7-3 *Mandatory.* The drilling area shall be inspected for hazards before starting the drilling operations.

56.7-4 *Mandatory.* Men shall not be on a mast while the drill-bit is in operation unless they are provided with a safe platform from which to work and they are required to use safety belts to avoid falling.

56.7-5 *Mandatory.* Drill crews and others shall stay clear of augers or drill stems that are in motion. Persons shall not pass under or step over a moving stem or auger.

56.7-6 and 56.7-7 [Reserved]

56.7-8 *Mandatory.* When a drill is being moved from one drilling area to another, drill steel, tools, and other equipment shall be secured and the mast placed in a safe position.

56.7-9 *Mandatory.* If a drill helper assists the drill operator during movement of a drill to a new location, the helper shall be in sight of, or in communication with, the operator at all times.

56.7-10 *Mandatory.* In the event of power failure, drill controls shall be placed in the neutral position until power is restored.

56.7-11 *Mandatory.* The drill stem shall be resting on the bottom of the hole or on the platform with the stem secured to the mast before attempts are made to straighten a crossed cable on a reel.

56.7-12 *Mandatory.* While in operation, drills shall be attended at all times.

56.7-13 *Mandatory.* Drill holes large enough to constitute a hazard shall be covered or guarded.

56.7-14 through 56.7-17 [Reserved]

56.7-18 *Mandatory.* Men shall not hold the drill steel while collaring holes, or rest their hands on the chuck or centralizer while drilling.

56.7-19 through 56.7-49 [Reserved]

56.7-50 *Mandatory.* Receptacles or racks shall be provided for drill steel and tools stored or carried on drills.

56.7-51 *Mandatory.* To prevent injury to personnel, tools and other objects shall not be left loose on the mast or drill platform.

56.7-52 *Mandatory.* Persons shall not drill from—

(a) Positions which hinder their access to the control levers;

(b) Insecure footing or insecure staging; or

(c) Atop equipment not suitable for drilling.

56.7-53 *Mandatory.* Before hand-held drills are moved from one working area to another, air shall be turned off and bled from the hose.

56.7-54 through 56.7-100 [Reserved]

[34 FR 12511, July 31, 1969, as amended at 35 FR 3668, Feb. 25, 1970; 35 FR 18590, Dec. 8, 1970; 44 FR 48521, Aug. 17, 1979]

§ 56.8 Rotary jet piercing.

56.8-1 Jet drill should be provided with:

(a) A system to pressurize operators cabs;

(b) A protective cover over the oxygen flow indicator.

56.8-2 *Mandatory.* Safety chains or other suitable locking devices shall be provided across connections to and between high pressure oxygen hose lines of 1-inch inside diameter or larger.

56.8-3 *Mandatory.* A suitable means of protection shall be provided for the employee when lighting the burner.

56.8-4 With equipment requiring refueling at locations other than fueling stations, a system for fueling from the ground without spill should be provided.

56.8-5 *Mandatory.* Men shall not smoke and open flames shall not be used in the vicinity of the oxygen storage and supply lines. Signs warning against smoking and open flames shall be posted in these areas.

56.8-6 *Mandatory.* The oxygen intake coupling on jet-piercing drills shall be constructed so that only the oxygen hose can be coupled to it.

56.8-7 *Mandatory.* The combustion chamber of a jet drill stem which has been sitting unoperated in a drill hole shall be flushed with a suitable solvent after the stem is pulled up.

[34 FR 12511, July 31, 1969, as amended at 39 FR 24318, July 1, 1974; 44 FR 48522, Aug. 17, 1979]

§ 56.9 Loading, hauling, dumping.

56.9-1 *Mandatory.* Self-propelled equipment that is to be used during a shift shall be inspected by the equipment operator before being placed in operation. Equipment defects affecting safety shall be reported to, and recorded by the mine operator. The records shall be maintained at the mine or nearest mine office for at least 6 months from the date the defects are recorded. Such records shall be made available for inspection by the Secretary of Labor or his duly authorized representative.

56.9-2 *Mandatory.* Equipment defects affecting safety shall be corrected before the equipment is used.

56.9-3 *Mandatory.* Powered mobile equipment shall be provided with adequate brakes.

56.9-4 [Reserved]

56.9-5 *Mandatory.* Operators shall be certain, by signal or other means, that all persons are clear before starting or moving equipment.

56.9-6 *Mandatory.* When the entire length of a conveyor is visible from the starting switch, the operator shall visually check to make certain that all persons are in the clear before starting the conveyor. When the entire length of the conveyor is not visible from the starting switch, a positive audible or visual warning system shall be installed and operated to warn persons that the conveyor will be started.

56.9-7 *Mandatory.* Unguarded conveyors with walkways shall be equipped with emergency stop devices or cords along their full length.

56.9-8 [Reserved]

56.9-9 *Mandatory.* Operators shall sound warning before starting trains and when trains approach crossings, other trains on adjacent tracks, persons, and any place where vision is obscured.

56.9-10 *Mandatory.* Equipment operators' cabs shall not be equipped, altered or otherwise modified in a manner which impairs operating visibility.

56.9-11 *Mandatory.* Cab windows shall be of safety glass or equivalent, in good condition and shall be kept clean.

56.9-12 *Mandatory.* Cabs of mobile equipment shall be kept free of extraneous materials.

56.9-13 *Mandatory.* Adequate backstops or brakes shall be installed on inclined-conveyor drive units to prevent conveyors from running in reverse if a hazard to personnel would be caused.

56.9-14 *Mandatory.* No person shall be permitted to ride a power-driven chain, belt, or bucket conveyor, unless the belt is specifically designed for the transportation of persons.

56.9-15 *Mandatory.* Unless the operator is otherwise protected, slushers in excess of 10 horsepower shall be provided with backlash guards. All slushers shall be equipped with rollers, and drum covers, and anchored securely before slushing operations are started.

56.9-16 *Mandatory.* Roadbeds, rails, joints, switches, frogs, and other trackage elements on railroads subject to the control of the operator shall be designed, installed and maintained in a safe manner consistent with the speed and type of haulage.

56.9-17 *Mandatory.* Equipment operating speeds shall be consistent with conditions of roadways, grades, clearance, visibility, traffic, and the type of equipment used.

56.9-18 [Reserved]

56.9-19 *Mandatory.* Track guardrails, lead rails, and frogs shall be protected or blocked so as to prevent a person's foot from becoming wedged.

56.9-20 *Mandatory.* Positive-acting stopblocks, derail devices, track skates, or other adequate means shall be installed wherever necessary to protect persons from runaway or moving railroad equipment.

56.9-21 [Reserved]

56.9-22 *Mandatory.* Berms or guards shall be provided on the outer bank of elevated roadways.

56.9-23 *Mandatory.* Trackless haulage equipment shall be operated under power control at all times.

56.9-24 *Mandatory.* Mobile equipment operators shall have full control of the equipment while it is in motion.

56.9-25 *Mandatory.* Dippers, buckets, loading booms, or heavy suspended loads shall not be swung over the cabs of haulage vehicles until the drivers are out of the cabs and in safe locations, unless the trucks are designed specifically to protect the drivers from falling material.

56.9-26 *Mandatory.* A quick-close type air valve shall be provided on each piece of pneumatic-powered loading, hauling, and dumping equipment. The valve shall be closed except when the equipment is being operated.

56.9-27 *Mandatory.* When an operator is present, men shall notify him before getting on or off equipment.

56.9-28 *Mandatory.* Switch throws shall be installed so as to provide adequate clearance for switchmen.

56.9-29 [Reserved]

56.9-30 *Mandatory.* Men shall not work or pass under the buckets or booms of loaders in operation.

56.9-31 *Mandatory.* When traveling between work areas, the equipment shall be secured in the travel position.

56.9-32 *Mandatory.* Dippers, buckets, scraper blades, and similar movable parts shall be secured or lowered to the ground when not in use.

56.9-33 [Reserved]

56.9-34 *Mandatory.* Haulage equipment shall be loaded in a manner to minimize spillage during haulage.

56.9-35 *Mandatory.* Movement of two or more pieces of rail equipment operating independently on the same track shall be suitably controled for safe operation.

56.9-36 *Mandatory.* Electrically powered mobile equipment shall not be left unattended unless the master switch is in the off position, all operating controls are in the neutral position, and the brakes are set or other equivalent precautions are taken against rolling.

56.9-37 *Mandatory.* Mobile equipment shall not be left unattended unless the brakes are set. Mobile equipment with wheels or tracks, when parked on a grade, shall be either blocked or turned into a bank or rib; and the bucket or blade lowered to the ground to prevent movement.

56.9-38 [Reserved]

56.9-39 *Mandatory.* Men shall not get on or off moving equipment, except the trainmen may get on or off of slowly moving trains.

56.9-40 *Mandatory.* Men shall not be transported:

(a) In or on dippers, forks, clamshells, beds of trucks unless special provisions are made for their safety, or buckets except shaft buckets.

(b) On top of loaded haulage equipment.

(c) Outside the cabs and beds of mobile equipment, except trains.

(d) Between cars of trains.

(e) In conveyances equipped with unloading devices unless means are provided to prevent accidental starting of the unloading mechanism.

56.9-41 *Mandatory.* Only authorized persons shall be permitted to ride on trains or locomotives and they shall ride in a safe position.

56.9-42 *Mandatory.* Rocker-bottom or bottom-dump rail cars shall be equipped with locking devices.

56.9-43 and 56.9-44 [Reserved]

56.9-45 *Mandatory.* Equipment which is to be hauled shall be loaded and protected so as to prevent sliding or spillage.

56.9-46 *Mandatory.* Backpoling of trolleys shall be avoided wherever possible; but when necessary, backpoling shall be done only at slow speeds.

56.9-47 *Mandatory.* Parked railcars, unless held effectively by brakes, shall be blocked securely.

56.9-48 *Mandatory.* Railroad cars with braking systems, when in use, shall be equipped with effective brake shoes.

56.9-49 *Mandatory.* When in the dark or under conditions of limited visibility, all vehicles carrying loads which project beyond the sides or more than four feet beyond the rear of the vehicles shall display a warning light at the end of the projection; or in the light, a warning flag not less than 12 inches square shall be displayed at the end of the projection.

56.9-50 *Mandatory.* Railcars shall not be left on side tracks unless ample clearance is provided for traffic on adjacent tracks.

56.9-51 *Mandatory.* Persons shall not go over, under, or between cars unless the train is stopped and the motorman has been notified and the notice acknowledged.

56.9-52 *Mandatory.* Inability of a motorman to clearly recognize his brakeman's signals when the train is under the direction of the brakeman shall be construed by the motorman as a stop signal.

56.9-53 *Mandatory.* Water, debris or spilled material which create hazards to moving equipment shall be removed.

56.9-54 *Mandatory.* Berms, bumper blocks, safety hooks, or similar means shall be provided to prevent overtravel and overturning at dumping locations.

56.9-55 *Mandatory.* Where there is evidence that the ground at a dumping place may fail to support the weight of a vehicle, loads shall be dumped back from the edge of the bank.

56.9-56 *Mandatory.* Where necessary, bumper blocks or the equivalent shall be provided at track dead ends.

56.9-57 *Mandatory.* Grizzlies, grates, and other stationary sizing devices shall be anchored securely.

56.9-58 *Mandatory.* If truck spotters are used, they shall be well in the clear while trucks are backing into dumping positions and dumping; lights shall be used at night to direct trucks.

56.9-59 *Mandatory.* Public and permanent railroad crossings shall be posted with warning signs or signals, or shall be guarded when trains are passing and shall be planked or otherwise filled between the rails.

56.9-60 *Mandatory.* Where overhead clearance is restricted, warning devices shall be installed and the restricted area shall be conspicuously marked.

56.9-61 *Mandatory.* Stockpile and muckpile faces shall be trimmed to prevent hazards to personnel.

56.9-62 *Mandatory.* Rocks too large to be handled safely shall be broken before loading.

56.9-63 *Mandatory.* Ramps and dumping facilities shall—

(a) Be of substantial construction; and

(b) Have suitable width, clearance, and headroom to accommodate the equipment using the facilities.

56.9-64 *Mandatory.* Chute-loading installations shall be designed so that the men pulling chutes are not required to be in a hazardous position while loading cars.

56.9-65 *Mandatory.* Cars shall not be coupled, or uncoupled, manually from the inside of curves unless the railroad and cars are so designed to eliminate any hazard from manual coupling.

56.9-66 *Mandatory.* When a locomotive on one track is used to move equipment on a different track, a suitable chain, cable, or drawbar shall be used.

56.9-67 *Mandatory.* Facilities used to transport men to and from work areas shall not be overcrowded.

56.9-68 *Mandatory.* Lights, flares, or other warning devices shall be posted when parked equipment creates a hazard to vehicular traffic.

56.9-69 *Mandatory.* Tires shall be deflated before repairs on them are started and adequate means shall be provided to prevent wheel locking rims from creating a hazard during tire inflation.

56.9-70 *Mandatory.* A tow bar of substantial construction or other suitable means of control shall be used to tow heavy equipment. A substantial safety chain or wire rope shall be used in conjunction with any primary rigging.

56.9-71 *Mandatory.* Traffic rules including speed, signals, and warning signs shall be standardized at each mine and posted.

56.9-72 *Mandatory.* Persons attempting to free hangups shall be experienced persons who understand the hazards involved.

56.9-73 *Mandatory.* Defective equipment, removed from service as unsafe to operate, shall be tagged to prohibit further use until repairs are completed.

56.9-74 *Mandatory.* Dust shall be suitably controlled at muck piles, material transfer points, crushers, and on haulage roads where hazards to personnel may be created as a result of impaired visibility.

56.9-75 through 56.9-82 [Reserved]

56.9-83 *Mandatory.* Where possible at least 30 inches continuous clearance from the farthest projection of moving railroad equipment shall be provided on at least one side of the tracks; all places where it is not possible to provide 30-inch clearance shall be marked conspicuously.

56.9-84 [Reserved]

56.9-85 *Mandatory.* Tools, materials and equipment shall not be transported with persons in vehicles, rail cars, and other conveyances unless means have been provided to make such transportation safe.

56.9-86 [Reserved]

56.9-87 *Mandatory.* Heavy duty mobile equipment shall be provided with audible warning devices. When the operator of such equipment has an obstructed view to the rear, the equipment shall have either an automatic reverse signal alarm which is audible above the surrounding noise level or an observer to signal when it is safe to back up.

56.9-88 *Mandatory.* (a) Excluding equipment that is operated by remote control, all self-propelled track-type (crawler mounted) or wheeled (rubber-tired) scrapers; front-end loaders; dozers; tractors, including industrial and agricultural tractors but not including over-the-road type tractors (the type that pull trailers or vans on highways); and motor graders; and wheeled prime movers (a tractor of the type and kind normally used as the mode of power for rubber-tired scrapers); all as used in metal and nonmetal mining operations, with or without attachments, shall be used in such mining only when equipped with (1) roll-over protective structures (ROPS) in accordance with the requirements of paragraphs (b) through (g) of this standard, as applicable, and (2) seat belts meeting the requirements of the Society of Automotive Engineers (SAE), Motor Vehicle Seat Belts Assemblies—SAE J4c, approved November 1955, revised July 1965; Seat Belt Hardware Test Procedures—SAE J140a, approved April 1970, revised February 1973; Seat Belt Hardware Performance Requirements—SAE J141; Operator Protection for Wheel Type Agricultural and Industrial Tractors—SAE J333a, approved April 1968; revised July 1970, conforms to ASAE S305; and Seat Belts for Construction Equipment—SAE J386, approved March 1968; and, in accordance with paragraphs (b), (c), and (e) of this standard, as applicable.

(b) Except as provided in paragraph (e) all self-propelled equipment described in paragraph (a) of this standard and manufactured on or after the effective date of this standard shall be equipped with (1) ROPS meeting the requirements of paragraph (d), and (2) seat belts meeting the requirements of SAE J4c, J140a, J141, J333a, and J386 specified in paragraph (a) of this standard.

(c) All self-propelled equipment described in paragraph (a) of this standard manufactured prior to the effective date of this standard and after June 30, 1969, shall be equipped with ROPS meeting the requirements of paragraphs (d) through (g) of this standard as appropriate, and seat belts, no later than the dates specified below:

(1) Equipment manufactured between July 1, 1971, and the effective date of this standard shall be equipped with ROPS and seat belts no later than 6 months after the effective date of this standard.

(2) Equipment manufactured between July 1, 1970, and June 30, 1971, shall be equipped with ROPS and seat belts no later than 10 months after the effective date of this standard.

(3) Equipment manufactured between July 1, 1969, and June 30, 1970, shall be equipped with ROPS and seat belts no later than 16 months after the effective date of this standard.

(4) Nothing in this standard shall preclude the issuance of an order because of imminent danger.

(d) Except as provided in paragraph (e) of this standard, self-propelled equipment described in paragraph (a) of this standard shall be deemed in compliance with the ROPS requirements of this standard if the ROPS meet the following requirements:

(1) The ROPS complies with the Society of Automotive Engineers, SAE Recommended Practice, Critical Zone—Characteristics and Dimensions for Operators of Construction and Industrial Machinery—SAE J397, approved July 1969, or Deflection Limiting Volume for Laboratory Evaluation of Roll-Over Protective Structures (ROPS) and Falling Object Protective Structures (FOPS) of Construction and Industrial Vehicles—SAE J397a, approved July 1969, revised January 1972, editorial change July 1973; and, as appropriate, the ROPS and installation of the ROPS meet the requirements of either SAE Recommended Practice, Performance Criteria for Roll-Over Protective Structures (ROPS) for Earthmoving, Construction, Logging, and Industrial Vehicles—SAE J1040, approved April 1974, or any of the following applicable SAE standards or recommended practices:

(i) Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired, Self-Propelled Scrapers—SAE J320a, approved November 1967, revised July 1969, editorial change June 1970; or

(ii) Minimum Performance Criteria for Roll-Over Protective Structures for Prime Moves—SAE J320b, approved November 1967, revised January 1972, editorial change September 1972; or

(iii) Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired Front End Loaders and Rubber-Tired Dozers—SAE J394, approved July 1969, editorial change July 1970, or Minimum Performance Criteria for Roll-Over Protective Structures for Wheeled Front-End Loaders and Wheeled Dozers—SAE J394a, approved July 1969, revised March 1972, editorial change September 1972; or

(iv) Minimum Performance Criteria for Roll-Over Structures for Crawler Tractors and Crawler-Type Loaders—SAE J395, approved July 1969, editorial change July 1970, or Minimum Performance Criteria for Roll-Over Protective Structures for Track-Type Tractors and Track-Type Front-End Loaders—SAE J395a, approved July 1969, revised January 1972, editorial change September 1972; or

(v) Minimum Performance Criteria for Roll-Over Protective Structure for Motor Graders— SAE J396, approved 1969, editorial change July 1970, or Minimum Performance Criteria for Roll-Over Protective Structures for Motor Graders—SAE J396a, approved July 1969, revised March 1972, editorial change September 1972; or

(vi) Operator Protection for Wheel Type Agricultural and Industrial Tractors—SAE J333a, approved April 1968, revised July 1970, conforms to ASAE S305; and Protective Frame Test Procedure and Performance Requirements—SAE J334a, approved April 1968, revised July 1970, conforms to ASAE S306.

(2) The ROPS is installed on the equipment in accordance with the recommendations of the ROPS manufacturer. If the installation includes bolts and nuts, the bolts and nuts used to attach the ROPs to the equipment frame and to connect structural parts of the ROPS shall be SAE Grade 5 or 8 (SAE J429g and J995b).

(e) All self-propelled equipment described in paragraph (a) of the standard, manufactured prior to the effective date of this standard, shall be deemed in compliance with the standard if ROPS and seat belt installations meet the ROPS and seat belt requirements of the State of California; or the U.S. Army Corps of Engineers; or the Bureau of Reclamation; or MSHA coal mine regulations of the U.S. Department of Labor; or the Occupational Safety and Health Administration of the U.S. Department of Labor. The requirements in effect are:

(1) State of California: Title 8 of the California Administrative Code: Construction Safety Orders, Article 10, "Haulage and Earth Moving," 1591 (i) and 1596 (Register 70, No. 40—10-3-70); General Industry Safety Orders, Article 25, "Industrial Trucks, Tractors, Haulage Vehicles, and Earth Moving Equipment," 3650-55 (Register 72, No. 6—2-5-72); and Logging and Sawmill Safety Orders, Article 7, "Tractor Yarding," 5243 (Register 69, No. 10—3-8-69), all issued by the Division of Industrial Safety, State of California.

(2) U.S. Army Corps of Engineers: Manuals—Corps of Engineers, U.S. Army Safety-General Safety Requirements, EM-385-1-1 (March 1967), or Change 1, March 27, 1972.

(3) Bureau of Reclamation, U.S. Department of the Interior: Section 9, "Machinery and Mechanized Equipment," Safety and Health Regulations for Construction, Part II—Bureau of Reclamation (September 1971).

(4) Mine Safety and Health Administration, U.S. Department of Labor: Section 77.403a, Part 77, Title 30, (Code of Federal Regulations—Mandatory Safety Standards, Surface Coal Mines and Surface Work Areas of Underground Coal Mines, promulgated in the Federal Register (39 FR 24006-24009).

(5) Occupational Safety and Health Administration, U.S. Department of Labor: Sections 1926.1001 and 1926.1002, Title 29, Code of Federal Regulations—Safety and Health Regulations for Construction, promulgated in the Federal Register (37 FR 27585-27590), and republished in the Federal Register (39 FR 22880-22886).

(f) Any alteration, repair, or welding of the ROPS and ROPS-to-vehicle frame mounts shall be performed only with prior approval and with instructions from the ROPS manufacturer or under the instructions of a registered professional engineer; and the manufacturer, or engineer, as the case may be, shall decide what qualifications the welders involved in this operation must have.

(g) Each ROPS shall have the following information permanently affixed to the structure:

(1) Manufacturer's or fabricator's name and address; and

(2) ROPS model number, if any; and

(3) Make and model numbers of the equipment on which the ROPS is designed to fit.

(4) For equipment already in existence when this standard goes into effect, a satisfactory substitute for the above-required information will be a certificate from either the manufacturer of the ROPS or a registered professional engineer to the effect that the ROPS does meet the performance standards and is appropriate for the piece of equipment upon which it is installed.

(h) Publications to which references are made in this standard are hereby incorporated by reference and made a part hereof. The incorporated publications are available at each Metal and Nonmetal Mine Safety and Health Subdistrict Office, MSHA. State of California safety orders are available from the State of California Office of Procurement, Documents Section, Post Office Box 20191, Sacramento, California 95820. The U.S. Army Corps of Engineers, Safety-General Safety Requirements are available from the U.S. Government Printing Office, Washington, D.C. 20402. Bureau of Reclamation Safety and Health Regulations for Construction are available from the Bureau of Reclamation, Division of Safety, Engineering and Research Center, Denver, Colorado 80225. SAE documents are available from the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 15096.

OMB Control No. 1219-0064, paragraph 56.9-1. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12511, July 31, 1969, as amended at 35 FR 3668, Feb. 25, 1970; 37 FR 14372, July 19, 1972; 41 FR 23615, June 10, 1976; 42 FR 7009, Feb. 4, 1977; 42 FR 29420, June 8, 1977; 42 FR 57041, Oct. 31, 1977; 43 FR 12318, Mar. 24, 1978; 44 FR 31916, June 1, 1979; 44 FR 48522, Aug. 17, 1979; 45 FR 68935, Oct. 17, 1980; 47 FR 14706, Apr. 6, 1982]

§ 56.10 Aerial tramways.

56.10-1 *Mandatory.* Buckets shall not be overloaded, and feed shall be regulated to prevent spillage.

56.10-2 *Mandatory.* Inspection and maintenance of carriers (including loading and unloading mechanisms), ropes and supports, and brakes shall be performed by competent persons according to the recommendations of the manufacturer.

56.10-3 *Mandatory.* Any hazardous defects shall be corrected before the equipment is used.

56.10-4 *Mandatory.* Positive-action-type brakes and devices which apply the brakes automatically in the event of a power failure shall be provided on aerial tramways.

56.10-5 *Mandatory.* Track cable connections should be designed to offer minimum obstruction to the passage of wheels.

56.10-6 *Mandatory.* Towers shall be suitably protected from swaying buckets.

56.10-7 *Mandatory.* Guard nets or other suitable protection shall be provided where tramways pass over roadways, walkways, or buildings.

56.10-8 *Mandatory.* Persons other than maintenance men shall not ride aerial tramways unless the following features are provided:

(a) Two independent brakes, each capable of holding the maximum load;

(b) Direct communication between terminals;

(c) Power drives with emergency power available in case of primary power failure; and

(d) Buckets equipped with positive locks to prevent accidental tripping or dumping.

56.10-9 *Mandatory.* Men shall not ride loaded buckets.

56.10-10 *Mandatory.* Where possible, aerial tramways shall not be started until the operator has ascertained that everyone is in the clear.

[34 FR 12511, July 31, 1969, as amended at 35 FR 3669, Feb. 25, 1970; 44 FR 48522, Aug. 17, 1979]

§ 56.11 Travelways.

56.11-1 *Mandatory.* Safe means of access shall be provided and maintained to all working places.

56.11-2 *Mandatory.* Crossovers, elevated walkways, elevated ramps, and stairways shall be of substantial construction provided with handrails, and maintained in good condition. Where necessary, toeboards shall be provided.

56.11-3 *Mandatory.* Ladders shall be of substantial construction and maintained in good condition.

56.11-4 *Mandatory.* Portable rigid ladders shall be provided with suitable bases and placed securely when used.

56.11-5 *Mandatory.* Fixed ladders shall be anchored securely and installed to provide at least 3 inches of toe clearance.

56.11-6 *Mandatory.* Fixed ladders shall project at least 3 feet above landings, or substantial handholds shall be provided above the landings.

56.11-7 *Mandatory.* Wooden components of ladders shall not be painted except with a transparent finish.

56.11-8 [Reserved]

56.11-9 *Mandatory.* Walkways with outboard railings shall be provided wherever persons are required to walk alongside elevated conveyor belts. Inclined railed walkways shall be nonskid or provided with cleats.

56.11-10 *Mandatory.* Vertical clearance above stair steps shall be a minimum of seven (7) feet, or suitable warning signs or similar devices shall be provided to indicate an impaired clearance.

56.11-11 *Mandatory.* Persons using ladders shall face the ladders and have both hands free for climbing and descending.

56.11-12 *Mandatory.* Openings above, below, or near travelways through which men or materials may fall shall be protected by railings, barriers, or covers. Where it is impractical to install such protective devices, adequate warning signals shall be installed.

56.11-13 *Mandatory.* Crossovers shall be provided where it is necessary to cross conveyors.

56.11-14 *Mandatory.* Moving conveyors shall be crossed only at designated crossover points.

56.11-15 [Reserved]

56.11-16 *Mandatory.* Regularly used walkways and travelways shall be sanded, salted, or cleared of snow and ice as soon as practicable.

56.11-17 *Mandatory.* Fixed ladders shall not incline backwards.

56.11-18 through 56.11-24 [Reserved]

56.11-25 *Mandatory.* Fixed ladders, except on mobile equipment, shall be offset and have substantial railed landings at least every 30 feet unless backguards or equivalent protection, such as safety belts and safety lines, are provided.

56.11-26 *Mandatory.* Fixed ladders 70 degrees to 90 degrees from the horizontal and 30 feet or more in length shall have backguards, cages or equivalent protection, starting at a point not more than seven (7) feet from the bottom of the ladders.

56.11-27 *Mandatory.* Scaffolds and working platforms shall be of substantial construction and provided with handrails and maintained in good condition. Floor boards shall be laid properly and the scaffolds and working platforms shall not be overloaded. Working platforms shall be provided with toeboards when necessary.

[34 FR 12511, July 31, 1969, as amended at 35 FR 3669, Feb. 25, 1970; 37 FR 14372, July 19, 1972; 44 FR 48522, Aug. 17, 1979]

§ 56.12 Electricity.

56.12-1 *Mandatory.* Circuits shall be protected against excessive overload by fuses or circuit breakers of the correct type and capacity.

56.12-2 *Mandatory.* Electric equipment and circuits shall be provided with switches or other controls. Such switches or controls shall be of approved design and construction and shall be properly installed.

56.12-3 *Mandatory.* Individual overload protection or short circuit protection shall be provided for the trailing cables of mobile equipment.

56.12-4 *Mandatory.* Electrical conductors shall be of a sufficient size and current-carrying capacity to ensure that a rise in temperature resulting from normal operations will not damage the insulating materials. Electrical conductors exposed to mechanical damage shall be protected.

56.12-5 *Mandatory..* Mobil equipment shall not run over power conductors, nor shall loads be dragges over power conductors, unless the conductors are properly bridged or protected.

56.12-6 *Mandatory.* Distribution boxes shall be provided with a disconnecting device for each branch circuit. Such disconnecting devices shall be equipped or designed in such a manner that it can be determined by visual observation when such a device is open and that the circuit is deenergized, the distribution box shall be labeled to show which circuit each device controls.

56.12-7 *Mandatory.* Trailing cable and power-cable connections to junction boxes shall not be made or broken under load.

56.12-8 *Mandatory.* Power wires and cables shall be insulated adequately where they pass into or out of electrical compartments. Cables shall enter metal frames of motors, splice boxes, and electrical compartments only through proper fittings. When insulated wires, other than cables, pass through metal frames, the holes shall be substantially bushed with insulated bushings.

56.12-9 [Reserved]

56.12-10 *Mandatory.* Telephone and low-potential signal wire shall be protected, by isolation or suitable insulation, or both, from contacting energized power conductors or any other power source.

56.12-11 *Mandatory.* High-potential electrical conductors shall be covered, insulated, or placed to prevent contact with low potential conductors.

56.12-12 *Mandatory.* The potential on bare signal wires accessible to contact by persons shall not exceed 48 volts.

56.12-13 *Mandatory.* Permanent splices and repairs made in power cables, including the ground conductor where provided, shall be: (a) Mechanically strong with electrical conductivity as near as possible to that of the original; (b) Insulated to a degree at least equal to that of the original, and sealed to exclude moisture; and (c) Provided with damage protection as near as possible to that of the original, including good bonding to the outer jacket.

56.12-14 *Mandatory.* Power cables energized to potentials in excess of 150 volts, phase-to-ground, shall not be moved with equipment unless sleds or slings, insulated from such equipment, are used. When such energized cables are moved manually, insulated hooks, tongs, ropes, or slings shall be used unless suitable protection for persons is provided by other means. This does not prohibit pulling or dragging of cable by the equipment it powers when the cable is physically attached to the equipment by suitable mechanical devices, and the cable is insulated from the equipment in conformance with other standards in this part.

56.12-15 [Reserved]

56.12-16 *Mandatory.* Electrically powered equipment shall be deenergized before mechanical work is done on such equipment. Power switches shall be locked out or other measures taken which shall prevent the equipment from being energized without the knowledge of the individuals working on it. Suitable warning notices shall be posted at the power switch and signed by the individuals who are to do the work. Such locks or preventive devices shall be removed only by the persons who installed them or by authorized personnel.

56.12-17 *Mandatory.* Power circuits shall be deenergized before work is done on such circuits unless hot-line tools are used. Suitable warning signs shall be posted by the individuals who are to do the work. Switches shall be locked out or other measures taken which shall prevent the power circuits from being energized without the knowledge of the individuals working on them. Such locks, signs, or preventative devices shall be removed only by the person who installed them or by authorized personnel.

56.12-18 *Mandatory.* Principal power switches shall be labeled to show which units they control, unless identification can be made readily by location.

56.12-19 *Mandatory.* Where access is necessary, suitable clearance shall be provided at stationary electrical equipment or switchgear.

56.12-20 *Mandatory.* Dry wooden platforms, insulating mats, or other electrically nonconductive material shall be kept in place at all switchboards and power-control switches where shock hazards exist. However, metal plates on which a person normally would stand and which are kept at the same potential as the grounded, metal, non-current-carrying parts of the power switches to be operated may be used.

56.12-21 *Mandatory.* Suitable danger signs shall be posted at all major electrical installations.

56.12-22 *Mandatory.* Areas containing major electrical installations shall be entered only by authorized persons.

56.12-23 *Mandatory.* Electrical connections and resistor grids that are difficult or impractical to insulate shall be guarded, unless protection is provided by location.

56.12-24 [Reserved]

56.12-25 *Mandatory.* All metal enclosing or encasing electrical circuits shall be grounded or provided with equivalent protection. This requirement does not apply to battery-operated equipment.

56.12-26 *Mandatory.* Metal fencing and metal buildings enclosing transformers and switchgear shall be grounded.

56.12-27 *Mandatory.* Frame grounding or equivalent protection shall be provided for mobile equipment powered through trailing cables.

56.12-28 *Mandatory.* Continuity and resistance of grounding systems shall be tested immediately after installation, repair, and modification; and annually thereafter. A record of the resistance measured during the most recent test shall be made available on a request by the Secretary or his duly authorized representative.

56.12-29 [Reserved]

56.12-30 *Mandatory.* When a potentially dangerous condition is found it shall be corrected before equipment or wiring is energized.

56.12-31 [Reserved]

56.12-32 *Mandatory.* Inspection and cover plates on electrical equipment and junction boxes shall be kept in place at all times except during testing or repairs.

56.12-33 *Mandatory.* Hand-held electric tools shall not be operated at high potential voltages.

56.12-34 *Mandatory.* Portable extension lights, and other lights that by their location present a shock or burn hazard, shall be guarded.

56.12-35 *Mandatory.* Lamp sockets shall be of a weatherproof type where they are exposed to weather or wet conditions that may interfere with illumination or create a shock hazard.

56.12-36 *Mandatory.* Fuses shall not be removed or replaced by hand in an energized circuit, and they shall not otherwise be removed or replaced in an energized circuit unless equipment and techniques especially designed to prevent electrical shock are provided and used for such purpose.

56.12-37 *Mandatory.* Fuse tongs or hot line tools shall be used when fuses are removed or replaced in high-potential circuits.

56.12-38 *Mandatory.* Trailing cables shall be attached to machines in a suitable manner to protect the cable from damage and to prevent strain on the electrical connections.

56.12-39 *Mandatory.* Surplus trailing cables to shovels, cranes and similar equipment shall be—

(a) Stored in cable boats;

(b) Stored on reels mounted on the equipment; or

(c) Otherwise protected from mechanical damage.

56.12-40 *Mandatory.* Operating controls shall be installed so that they can be operated without danger of contract with energized conductors.

56.12-41 *Mandatory.* Switches and starting boxes shall be of safe design and capacity.

56.12-42 *Mandatory.* Both rails shall be bonded or welded at every joint and rails shall be crossbonded at least every 200 feet if the track serves as the return trolley circuit. When rails are moved, replaced, or broken bonds are discovered, they shall be rebonded within three working shifts.

56.12-43 and 56.12-44 [Reserved]

56.12-45 *Mandatory.* Overhead high-potential powerlines shall be installed as specified by the National Electrical Code.

56.12-46 [Reserved]

56.12-47 *Mandatory.* Guy wires of poles supporting high-voltage transmission lines shall meet the requirements for grounding or insulator protection of the National Electrical Safety Code, Part 2, entitled "Safety Rules for the Installation and Maintenance of Electric Supply and Communication Lines" (also referred to as National Bureau of Standards Handbook 81, November 1, 1961) and Supplement 2 thereof issued March 1968, which are hereby incorporated by reference and made a part hereof. These publications and documents may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration.

56.12-48 *Mandatory.* Telegraph, telephone, or signal wires shall not be installed on the same crossarm with power conductors. When carried on poles supporting powerlines, they shall be installed as specified by the National Electrical Code.

56.12-49 [Reserved]

56.12-50 *Mandatory.* Trolley wires shall be installed at least seven (7) feet above rails where height permits, and aligned and supported to suitably control sway and sag.

56.12-51 and 56.12-52 [Reserved]

56.12-53 *Mandatory.* Ground wires for lighting circuits powered from trolley wires shall be connected securely to the ground-return circuit.

56.12-54 through 56.12-64 [Reserved]

56.12-65 *Mandatory.* Powerlines, including trolley wires, and telephone circuits shall be protected against short circuits and lightning.

56.12-66 *Mandatory.* Where metallic tools or equipment can come in contact with trolley wires or bare powerlines, the lines shall be guarded or deenergized.

56.12-67 *Mandatory.* Transformers shall be totally enclosed, or shall be placed at least 8 feet above the ground, or installed in a transformer house, or surrounded by a substantial fence at least 6 feet high and at least 3 feet from any energized parts, casings, or wiring.

56.12-68 *Mandatory.* Transformer enclosures shall be kept locked against unauthorized entry.

56.12-69 *Mandatory.* Each ungrounded power conductor or telephone wire that leads underground and is directly exposed to lightning shall be equipped with suitable lightning arrestors of approved type within 100 feet of the point where the circuit enters the mine. Lightning arrestors shall be connected to a low resistance grounding medium on the surface and shall be separated from neutral grounds by a distance of not less than 25 feet.

56.12-70 [Reserved]

56.12-71 *Mandatory.* When equipment must be moved or operated near energized high-voltage powerlines (other than trolley lines) and the clearance is less than 10 feet, the lines shall be deenergized or other precautionary measures shall be taken.

[34 FR 12511, July 31, 1969, as amended at 35 FR 3669, Feb. 25, 1970; 35 FR 18590, Dec. 8, 1970; 37 FR 14372, July 19, 1972; 39 FR 24318, July 1, 1974; 42 FR 29420, June 8, 1977; 42 FR 36462, July 15, 1977; 42 FR 57041, Oct. 31, 1977; 44 FR 48523, Aug. 17, 1979]

§ 56.13 Compressed air and boilers.

GENERAL

56.13-1 *Mandatory.* All boilers and pressure vessels shall be constructed, installed, and maintained in accordance with the standards and specifications of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.

56.13-2 through 56.13-9 [Reserved]

COMPRESSED AIR

56.13-10 *Mandatory.* (a) Reciprocating-type air compressors rated over 10 horsepower shall be equipped with automatic temperature-actuated shutoff mechanisms which shall be set or adjusted to the compressor when the normal operating temperature is exceeded by more than 25 percent.

(b) However, this standard does not apply to reciprocating-type air compressors rated over 10 horsepower if equipped with fusible plugs that were installed in the compressor discharge lines before November 15, 1979, and designed to melt at temperatures at least 50 degrees below the flash point of the compressors' lubricating oil.

56.13-11 *Mandatory.* Air receiver tanks shall be equipped with one or more automatic pressure-relief valves. The total relieving capacity of the relief valves shall prevent pressure from exceeding the maximum allowable working pressure in a receiver tank by not more than 10 percent. Air receiver tanks also shall be equipped with indicating pressure gages which accurately measure the pressure within the air receiver tanks.

56.13-12 *Mandatory.* Compressor air intakes shall be installed to insure that only clean, uncontaminated air enters the compressors.

56.13-13 and 56.13-14 [Reserved]

56.13-15 *Mandatory.* (a) Compressed-air receivers and other unfired pressure vessels shall be inspected by inspectors holding a valid National Board Commission and in accordance with the applicable chapters of the National Board Inspection Code, a Manual for Boiler and Pressure Vessel Inspectors, 1979. This code is incorporated by reference and made a part of this standard, may be examined at any Metal and Nonmetal Mine Safety and Health District Office of the Mine Safety and Health Administration, and may be obtained from the publisher, the National Board of Boiler and Pressure Vessel Inspector, 1055 Crupper Avenue, Columbus, Ohio 43229.

(b) Records of inspections shall be kept in accordance with requirements of the National Board Inspection Code, and the records shall be made available to the Secretary or his authorized representative.

56.13-16 [Reserved]

56.13-17 *Mandatory.* Compressor discharge pipes where carbon build-up may occur shall be cleaned periodically as recommended by the manufacturer, but no less frequently than once every two (2) years.

56.13-18 [Reserved]

56.13-19 *Mandatory.* Repairs involving the pressure system of compressors, receivers, or compressed-air-powered equipment shall not be attempted until the pressure has been bled off.

56.13-20 *Mandatory.* At no time shall compressed air be directed toward a person. When compressed air is used, all necessary precautions shall be taken to protect persons from injury.

56.13-21 *Mandatory.* Except where automatic shutoff valves are used, safety chains or other suitable locking devices shall be used at connections to machines of high-pressure hose lines of ¾-inch inside diameter or larger, and between high-pressure hose lines of ¾-inch inside diameter or larger, where a connection failure would create a hazard.

56.13-22 through 56.13-29 [Reserved]

BOILERS

56.13-30 *Mandatory.* (a) Fired pressure vessels (boilers) shall be equipped with water level gages, pressure gages, automatic pressure-relief valves, blowdown piping, and other safety devices approved by the American Society of Mechanical Engineers to protect against hazards from overpressure, flameouts, fuel interruptions and low water level, all as required by the appropriate sections, chapters and appendices listed in paragraph (b) (1) and (2) below.

(b) These gages, devices and piping shall be designed, installed, operated, maintained, repaired, altered, inspected, and tested by inspectors holding a valid National Board Commission and in accordance wit' the following listed sections, chapters and appendices:

(1) The ASME Boiler and Pressure Vessel Code, 1977, published by the American Society of Mechanical Engineers.

Section and Title

I Power Boilers
II Material Specifications—Part A—Ferrous
II Material Specifications—Part B—Nonferrous
II Material Specifications—Part C—Welding Rods, Electrodes, and Filler Metals
IV Heating Boilers
V Nondestructive Examination
VI Recommended Rules for Care and Operation of Heating Boilers
VII Recommended Rules for Care of Power Boilers

(2) The National Board Inspection Code, a Manual for Boiler and Pressure Vessel Inspectors, 1979, published by the National Board of Boiler and Pressure Vessel Inspectors.

Chapter and Title

I Glossary of Terms
II Inspection of Boilers and Pressure Vessels
III Repairs and Alterations to Boiler and Pressure Vessels by Welding
IV Shop Inspection of Boilers and Pressure Vessels
V Inservice Inspection of Pressure Vessels by Authorized Owner-User Inspection Agencies

Appendix and Title

A Safety and Safety Relief Valves
B Non-ASME Code Boilers and Pressure Vessels
C Storage of Mild Steel Covered Arc Welding Electrodes
D-R National Board "R" (Repair) Symbol Stamp
D-VR National Board "VR" (Repair of Safety and Safety Relief Valve) Symbol Stamp
D-VR1 Certificate of Authorization for Repair Symbol Stamp for Safety and Safety Relief Valves
D-VR2 Outline of Basic Elements of Written Quality Control System for Repairers of ASME Safety and Safety Relief Valves
D-VR3 Nameplate Stamping for "VR"
E Owner-user Inspection Agencies
F Inspection Forms

(c) Records of inspections and repairs shall be kept in accordance with the requirements of the ASME Boiler and Pressure Vessel Code and the National Board Inspection Code. The records shall be made available to the Secretary or his authorized representative.

(d) Sections of the ASME Boiler and Pressure Vessel Code, 1977, listed in paragraph (b)(1) above, and chapters and appendices of the National Board Inspection Code, 1979, listed in paragraph (b)(2) above, are incorporated by reference and made a part of this standard. These publications may be obtained from the publishers, the American Society of Mechanical Engineers, 345 East Forty-seventh Street, New York, N.Y. 10017, and the National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229. The publications may be examined at any Metal and Nonmetal Mine Safety and Health District Office of the Mine Safety and Health Administration.

56.13-31 through 56.13-34 [Reserved]

OMB CONTROL No. 1219-0056, paragraph 56.13-15 and 1219-0063, paragraph 56.13-20. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12511, July 31, 1969, as amended at 35 FR 3669, Feb. 25, 1970; 37 FR 14372, July 19, 1972; 44 FR 48523, Aug. 17, 1979; 44 FR 68828, Nov. 30, 1979; 47 FR 14706, Apr. 6, 1982]

§ 56.14 Use of equipment.

GUARDS

56.14-1 *Mandatory.* Gears; sprockets; chains; drive, head, tail, and takeup pulleys; flywheels; couplings; shafts; sawblades; fan inlets; and similar exposed moving machine parts which may be contacted by persons, and which may cause injury to persons, shall be guarded.

56.14-2 *Mandatory.* Overhead belts shall be guarded if the whipping action from a broken belt would be hazardous to persons below.

56.14-3 *Mandatory.* Guards at conveyor-drive, conveyor-head, and conveyor-tail pulleys shall extend a distance sufficient to prevent a person from accidentally reaching behind the guard and becoming caught between the belt and the pulley.

56.14-4 and 56.14-5 [Reserved]

56.14-6 *Mandatory.* Except when testing the machinery, guards shall be securely in place while machinery is being operated.

56.14-7 *Mandatory.* Guards shall be of substantial construction and properly maintained.

56.14-8 *Mandatory.* Stationary grinding machines other than special bit grinders shall be equipped with:

(a) Peripheral hoods (less than 90° throat openings) capable of withstanding the force of a bursting wheel;

(b) Adjustable tool rests set as close as practical to the wheel; and

(c) Safety washers.

56.14-9 *Mandatory.* Grinding wheels shall be operated within the specifications of the manufacturer of the wheel.

56.14-10 *Mandatory.* Hand-held power tools, other than rock drills, shall be equipped with controls requiring constant hand or finger pressure to operate the tools or shall be equipped with friction or other equivalent safety devices.

56.14-11 *Mandatory.* Guards, shields, or other suitable protection shall be provided in areas where flying or falling materials present a hazard to personnel.

56.14-12 [Reserved]

56.14-13 *Mandatory.* Fork-lift trucks, front-end loaders, and bulldozers shall be provided with substantial canopies when necessary to protect the operator.

56.14-14 *Mandatory.* Face shields or goggles, in good condition, shall be worn when operating a grinding wheel.

56.14-15 through 56.14-24 [Reserved]

METHODS AND PROCEDURES

56.14-25 [Reserved]

56.14-26 *Mandatory.* Unsafe equipment or machinery shall be removed from service immediately.

56.14-27 *Mandatory.* Operation of machinery or equipment shall be assigned only to competent persons.

56.14-28 [Reserved]

56.14-29 *Mandatory.* Repairs or maintenance shall not be performed on machinery until the power is off and the machinery is blocked against motion, except where machinery motion is necessary to make adjustments.

56.14-30 *Mandatory.* Men shall not work on or from a piece of mobile equipment in a raised position until it has been blocked in place securely. This does not preclude the use of equipment specifically designed as elevated mobile work platforms.

56.14-31 *Mandatory.* Drive belts shall not be shifted while in motion unless the machines are provided with mechanical shifters.

56.14-32 *Mandatory.* Belts, chains, and ropes shall not be guided onto power-driven moving pulleys, sprockets, or drums with the hands except on slow moving equipment especially designed for hand feeding.

56.14-33 *Mandatory.* Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

56.14-34 *Mandatory.* Belt dressing shall not be applied manually while belts are in motion unless an aerosol-type dressing is used.

56.14-35 *Mandatory.* Machinery shall not be lubricated while in motion where a hazard exists, unless equipped with extended fittings or cups.

56.14-36 *Mandatory.* Tools and equipment shall not be used beyond the design capacity intended by the manufacturer, where such use may create a hazard to personnel.

56.14-37 through 56.14-44 [Reserved]

56.14-45 *Mandatory.* Welding operations shall be shielded and well-ventilated.

[34 FR 12511, July 31, 1969, as amended at 35 FR 3669, Feb. 25, 1970; 37 FR 14372, July 19, 1972; 42 FR 7010, Feb. 4, 1977; 44 FR 48524, Aug. 17, 1979]

§ 56.15 Personal protection.

56.15-1 *Mandatory.* Adequate first-aid materials, including stretchers and blankets, shall be provided at places convenient to all working areas. Water or neutralizing agents shall be available where corrosive chemicals or other harmful substances are stored, handled, or used.

56.15-2 *Mandatory.* All persons shall wear suitable hard hats when in or around a mine or plant where falling objects may create a hazard.

56.15-3 *Mandatory.* All persons shall wear suitable protective footwear when in or around an area of a mine or plant where a hazard exists which could cause an injury to the feet.

56.15-4 *Mandatory.* All persons shall wear safety glasses, goggles, or face shields or other suitable protective devices when in or around an area of a mine or plant where a hazard exists which could cause injury to unprotected eyes.

56.15-5 *Mandatory.* Safety belts and lines shall be worn when men work where there is danger of falling; a second person shall tend the lifeline when bins, tanks, or other dangerous areas are entered.

56.15-6 *Mandatory.* Special protective equipment and special protective clothing shall be provided, maintained in a sanitary and reliable condition and used whenever (1) hazards of process or environment, (2) chemical hazards, (3) radiological hazards, or (4) mechanical irritants are encountered in a manner capable of causing injury or impairment.

56.15-7 *Mandatory.* Protective clothing or equipment and face shields, or goggles shall be worn when welding, cutting, or working with molten metal.

56.15-8 through 56.15-19 [Reserved]

56.15-20 *Mandatory.* Life jackets or belts shall be worn where there is danger from falling into water.

[34 FR 12511, July 31, 1969, as amended at 35 FR 3669, Feb. 25, 1970; 35 FR 18590, Dec. 8, 1970; 39 FR 24318, July 1, 1974; 42 FR 57041, Oct. 31, 1977; 44 FR 48524, Aug. 17, 1979]

§ 56.16 Materials storage and handling.

56.16-1 *Mandatory.* Supplies shall not be stacked or stored in a manner which creates tripping or fall-of-material hazards.

56.16-2 *Mandatory.* (a) Bins, hoppers, silos, tanks, and surge piles, where loose unconsolidated materials are stored, handled or transferred shall be—

(1) Equipped with mechanical devices or other effective means of handling materials so that during normal operations persons are not required to enter or work where they are exposed to entrapment by the caving or sliding of materials; and

(2) Equipped with supply and discharge operating controls. The controls shall be located so that spills or overruns will not endanger persons.

(b) Where persons are required to move around or over any facility listed in this standard, suitable walkways or passageways shall be provided.

(c) Where persons are required to enter any facility listed in this standard for maintenance or inspection purposes, ladders, platforms, or staging shall be provided. No person shall enter the facility until the supply and discharge of materials have ceased and the supply and discharge equipment is locked out. Persons entering the facility shall wear a safety belt or harness equipped with a lifeline suitably fastened. A second person, similarly equipped, shall be stationed near where the lifeline is fastened and shall constantly adjust it or keep it tight as needed, with minimum slack.

56.16-3 *Mandatory.* Materials that can create hazards if accidentally liberated from their containers shall be stored in a manner that minimizes the dangers.

56.16-4 *Mandatory.* Hazardous materials shall be stored in containers of a type approved for such use by recognized agencies; such containers shall be labeled appropriately.

56.16-5 *Mandatory.* Compressed and liquid gas cylinders shall be secured in a safe manner.

56.16-6 *Mandatory.* Valves on compressed gas cylinders shall be protected by covers when being transported or stored, and by a safe location when the cylinders are in use.

56.16-7 *Mandatory.* (a) Taglines shall be attached to loads that may require steadying or guidance while suspended.

(b) Hitches and slings used to hoist materials shall be suitable for the particular material handled.

56.16-8 [Reserved]

56.16-9 *Mandatory.* Men shall stay clear of suspended loads.

56.16-10 *Mandatory.* To protect personnel, material shall not be dropped from an overhead elevation until the drop area is first cleared of personnel and the area is then either guarded or a suitable warning is given.

56.16-11 *Mandatory.* Men shall not ride on loads being moved by cranes or derricks, nor shall they ride the hoisting hooks unless such method eliminates a greater hazard.

56.16-12 *Mandatory.* Chemical substances, including concentrated acids and alkalies, shall be stored to prevent inadvertent contact with each other or with other substances, where such contact could cause a violent reaction or the liberation of harmful fumes or gases.

56.16-13 *Mandatory.* Suitable warning shall be given before molten metal is poured and before a container of molten metal is moved.

56.16-14 *Mandatory.* Operator-carrying overhead cranes shall be provided with:

(a) Bumpers at each end of each rail;

(b) Automatic switches to halt uptravel of the blocks before they strike the hoist;

(c) Effective audible warning signals within easy reach of the operator; and

(d) A means to lock out the disconnect switch.

56.16-15 *Mandatory.* No person shall work from or travel on the bridge of an overhead crane unless the bridge is provided with substantial footwalks with toeboards and railings the length of the bridge.

56.16-16 *Mandatory.* Fork and other similar types of lift trucks shall be operated with the—

(a) Upright tilted back to steady and secure the load;

(b) Load in the upgrade position when ascending or descending grades in excess of 10 percent;

(c) Load not raised or lowered enroute except for minor adjustments; and

(d) Load-engaging device downgrade when traveling unloaded on all grades.

[34 FR 12511, July 31, 1969, as amended at 35 FR 3669, Feb. 25 1970; 44 FR 48524, Aug. 17, 1979]

§ 56.17 Illumination.

56.17-1 *Mandatory.* Illumination sufficient to provide safe working conditions shall be provided in and on all surface structures, paths, walkways, stairways, switch panels, loading and dumping sites, and work areas.

§ 56.18 Safety programs.

56.18-1 [Reserved]

56.18-2 *Mandatory.* (a) A competent person designated by the operator shall examine each working place at least once each shift for conditions which may adversely affect safety or health. The operator shall promptly initiate appropriate action to correct such conditions.

(b) A record that such examinations were conducted shall be kept by the operator for a period of one (1) year, and shall be made available for review by the Secretary or his authorized representative.

(c) In addition, conditions that may present an imminent danger which are noted by the person conducting the examination shall be brought to the immediate attention of the operator who shall withdraw all persons from the area affected (except persons referred to in section 104(c) of the Federal Mine Safety and Health Act of 1977) until the danger is abated.

56.18-3 through 56.18-5 [Reserved]

56.18-6 *Mandatory.* New employees shall be indoctrinated in safety rules and safe work procedures.

56.18-7 and 56.18-8 [Reserved]

56.18-9 *Mandatory.* When persons are working at the mine, a competent person designated by the mine operator shall be in attendance to take charge in case of an emergency.

56.18-10 *Mandatory.* Selected supervisors shall be trained in first aid. First aid training shall be made available to all interested employees.

56.18-11 [Reserved]

56.18-12 *Mandatory.* Emergency telephone numbers shall be posted at appropriate telephones.

56.18-13 *Mandatory.* A suitable communication system shall be provided at the mine to obtain assistance in the event of an emergency.

56.18-14 *Mandatory.* Arrangements shall be made in advance for obtaining emergency medical assistance and transportation for injured persons.

56.18-15 through 56.18-19 [Reserved]

56.18-20 *Mandatory.* No employee shall be assigned, or allowed, or be required to perform work alone in any area where hazardous conditions exist that would endanger his safety unless he can communicate with others, can be heard, or can be seen.

OMB CONTROL No. 1219-0059, paragraph 56.18-2. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12511, July 31, 1969, as amended at 35 FR 3670, Feb. 25, 1970; 38 FR 23381, Aug. 29, 1973; 44 FR 48525, Aug. 17, 1979; 47 FR 14706, Apr. 6, 1982]

§ 56.19 Man hoisting.

The hoisting standards in this section apply to those hoists and appurtenances used for hoisting persons. However, where persons may be endangered by hoists and appurtenances used solely for handling ore, rock, and materials, the appropriate standards should be applied.

Emergency hoisting facilities should conform to the extent possible to safety requirements for other hoists, and should be adequate to remove the persons from the mine with a minimum of delay.

HOISTS

56.19-1 *Mandatory.* Hoists shall have rated capacities consistent with the loads handled and the recommended safety factors of the ropes used.

56.19-2 *Mandatory.* Hoists shall be anchored securely.

56.19-3 *Mandatory.* Belt, rope, or chains shall not be used to connect driving mechanisms to man hoists.

56.19-4 *Mandatory.* Any hoist used to hoist men shall be equipped with a brake or brakes which shall be capable of holding its fully loaded cage, skip, or bucket at any point in the shaft.

56.19-5 *Mandatory.* The operating mechanism of the clutch of every man-hoist drum shall be provided with a locking mechanism, or interlocked electrically or mechanically with the brake to prevent accidental withdrawal of the clutch.

56.19-6 *Mandatory.* Automatic hoists shall be provided with devices that automatically apply the brakes in the event of power failure.

56.19-7 *Mandatory.* All man hoists shall be provided with devices to prevent overtravel. When utilized in shafts exceeding 100 feet in depth, such hoists shall also be provided with overspeed devices.

56.19-8 *Mandatory.* Where creep or slip may alter the effective position of safety devices, friction hoists shall be equipped with synchronizing mechanisms that recalibrate the overtravel devices and position indicators.

56.19-9 *Mandatory.* An accurate and reliable indicator of the position of the cage, skip, bucket, or cars in the shaft shall be provided.

56.19-10 *Mandatory.* Hoist controls shall be placed or housed so that the noise from machinery or other sources will not prevent hoistmen from hearing signals.

56.19-11 *Mandatory.* Flanges on drums shall extend radially a minimum of 4 inches or three rope diameters beyound the last wrap, whichever is the lesser.

56.19-12 *Mandatory.* Where grooved drums are used, the grooves shall be of suitable size and pitch for the ropes used.

56.19-13 *Mandatory.* Where any diesel or similar fuel-injection engine is used to power a hoist, the engine shall be equipped with a damper or other cutoff in its air intake system. The control handle shall be clearly labeled to indicate that its intended function is for emergency stopping only.

56.19-14 *Mandatory.* In a friction hoist installation, tapered guides or other approved devices shall be installed above and below the limits of regular travel of the conveyance and arranged to prevent overtravel in the event of failure of other devices.

56.19-15 and 56.19-16 [Reserved]

56.19-17 *Mandatory.* Each electric hoist shall be equipped with a manually-operable switch that will initiate emergency braking action to bring the conveyance and the counterbalance safely to rest. This switch shall be located within reach of the hoistman in case the manual controls of the hoist fail.

56.19-18 *Mandatory.* When an overtravel by-pass switch is installed, the switch shall function so as to allow the conveyance to be moved through the overtravel position when the switch is held in the close position by the hoistman. The overtravel by-pass switch shall return automatically to the open position when released by the hoistman.

56.19-19 [Reserved]

WIRE ROPE

56.19-20 [Reserved]

56.19-21 *Mandatory.* The following static-load safety factors shall be used for selecting ropes to be used for hoisting men and for determining when such ropes shall be removed from man hoists:

Length of rope in shaft (feet)	Minimum factor of safety (new rope)	Minimum factor of safety (remove)
500 or less	8	6.4
501 to 1,000	7	5.8
1,001 to 2,000	6	5.0
2,001 to 3,000	5	4.3
3,001 or more	4	3.6

56.19-22 *Mandatory.* The end of the rope at the drum shall make at least one full turn on the drum shaft, or a spoke of the drum in the case of a free drum, and shall be fastened securely by means of rope clips or clamps. There shall be three full turns of cable or rope on the hoisting drum when the cable or rope is extended to its maximum working length. This standard does not apply to friction hoists.

56.19-23 [Reserved]

56.19-24 *Mandatory.* The rope shall be attached to the load by the thimble-and-clip method, the socketing method, or other approved method. If the socketing method is employed, zinc or its equivalent shall be used. The use of Babbitt metal or lead for socketing wire ropes is prohibited. If the thimble-and-clip method is used, the following shall be observed:

(a) The rope shall be attached to the load by passing one end around an oval thimble that is attached to the load bending the end back so that it is parallel to the long or "live" end of the rope and fastening the two parts of the rope together with clips.

(b) The U-bolt of each clip shall encircle the short or "dead" end of the rope and the distance between clips shall not be less than the figures given in the accompanying table.

(c) As a minimum, the following number of clips or equivalent shall be used for various diameters of six-strand, 19-wire, plow-steel ropes:

(Follow manufacturer's recommendations for other kinds of wire rope and clips.)

Diameter of rope, inches	Number of clips	Center-to-center spacing of clips, inches
¾	4	4½
⅞	4	5¼
1	4	6
1⅛	5	6¾
1¼	5	7½
1⅜	6	8¼
1½	6	9
1⅝	6	9¾
1¾	7	10½
1⅞	8	11¼
2	8	12
2¼	8	13
2½	8	14

(d) For all ropes less than three-quarter inch in diameter at least four clips or equivalent shall be used.

(e) When special conditions require the attachment of a sling to the hoisting cable to handle equipment in the shaft, the sling shall be attached by clips or equivalent in accordance with the table in paragraph (c) of this standard.

56.19-25 [Reserved]

56.19-26 *Mandatory.* Safety device attachments to hoist ropes shall be selected, installed, and maintained according to manufacturers' specifications to minimize internal corrosion and weakening of the hoist rope.

56.19-27 through 56.19-34 [Reserved]

HEADFRAMES AND SHEAVES

56.19-35 *Mandatory.* All headframes shall be constructed with suitable design considerations to allow for all dead loads, live loads, and wind loads.

56.19-36 *Mandatory.* Headframes shall be high enough to provide clearance for overtravel and safe stopping of the conveyance.

56.19-37 *Mandatory.* Fleet angles on hoists installed after November 15, 1979, shall not be greater than one and one-half degrees for smooth drums or two degrees for grooved drums.

56.19-38 *Mandatory.* Platforms with toeboards and handrails shall be provided around elevated head sheaves.

56.19-39 *Mandatory.* All personnel hoists, except emergency escape hoists and hoists with rope speeds of 200 feet per minute or less, installed after November 15, 1979, shall have drum and sheave tread diameters—

(1) Not less than 60 times the hoist rope diameter for slope or inclined shaft applications;

(2) Not less than 80 times the hoist rope diameter if the hoist ropes are one inch in diameter or greater, or not less than 60 times the hoist rope diameter if the hoist ropes are less than one inch in diameter for vertical shaft applications; or

(3) Not less than 100 times the hoist rope diameter for locked coil ropes.

56.19-40 *Mandatory.* Head, idler, knuckle, and curve sheaves shall have grooves of proper contour for the specific rope diameter used.

56.19-41 through 56.19-44 [Reserved]

CONVEYANCES

56.19-45 *Mandatory.* Man cages and skips used for hoisting or lowering employees or other persons in any vertical shaft or any incline shaft with an angle of inclination of forty-five (45) degrees from the horizontal, shall be covered with a metal bonnet.

56.19-46 through 56.19-48 [Reserved]

56.19-49 *Mandatory.* Buckets shall not be used to hoist men except during shaft sinking operations, inspection, maintenance, and repairs.

56.19-50 *Mandatory.* Buckets used to hoist persons during vertical shaft sinking operations shall: (a) Be securely attached to a crosshead when traveling in either direction between the lower and upper crosshead parking locations; (b) Have overhead protection when the shaft depth exceeds 50 feet; (c) Have sufficient depth or a suitably designed platform to transport persons safely in a standing position; and (d) Have devices to prevent accidental dumping where the bucket is supported by a bail attached to its lower half.

56.19-51 and 56.19-52 [Reserved]

56.19-53 *Mandatory.* In shaft sinking where a platform is suspended by wire ropes, such ropes shall have an approved rating for the suspended load.

56.19-54 *Mandatory.* Where rope guides are used in shafts other than in shaft sinking operations, the rope guides shall be a type of lock coil construction.

HOISTING PROCEDURES

56.19-55 *Mandatory.* When a manually operated hoist is used, a qualified hoistman shall remain within hearing of the telephone or signal device at all times while any person is underground.

56.19-56 *Mandatory.* When automatic hoisting is used, a competent operator of the hoist shall be readily available at or near the hoisting device while any person is underground.

56.19-57 *Mandatory.* No person shall operate a hoist unless within the preceding 12 months he has had a medical examination by a qualified, licensed physician who shall certify his fitness to perform this duty. Such certification shall be available at the mine.

56.19-58 *Mandatory.* Only experienced hoistmen shall operate the hoist except in cases of emergency and in the training of new hoistmen.

56.19-59 and 56.19-60 [Reserved]

56.19-61 *Mandatory.* The safe speed for hoisting men shall be determined for each shaft, and this speed shall not be exceeded. Men shall not be hoisted at a speed faster than 2,500 feet per minute, except in an emergency.

56.19-62 *Mandatory.* Maximum normal operating acceleration and deceleration shall not exceed 6 feet per second per second. During emergency braking, the deceleration shall not exceed 16 feet per second per second.

56.19-63 *Mandatory.* Only authorized persons shall be in hoist rooms.

56.19-64 [Reserved]

56.19-65 *Mandatory.* Conveyances shall not be lowered by the brakes alone except during emergencies.

56.19-66 *Mandatory.* In shafts inclined over 45 degrees, the operator shall determine and post in the conveyance or at each shaft station the maximum number of persons permitted to ride in a hoisting conveyance at any one time. Each person shall be provided a minimum of 1.5 square feet of floor space.

56.19-67 *Mandatory.* During shift changes, an authorized person shall be in charge of each trip in which persons are hoisted.

56.19-68 *Mandatory.* Men shall enter, ride, and leave conveyances in an orderly manner.

56.19-69 *Mandatory.* Men shall not enter or leave conveyances which are in motion or after a signal to move the conveyance has been given to the hoistman.

56.19-70 *Mandatory.* Cage doors or gates shall be closed while men are being hoisted; they shall not be opened until the cage has come to a stop.

56.19-71 *Mandatory.* Men shall not ride in skips or buckets with mucks, supplies, materials, or tools other than small hand tools.

56.19-72 *Mandatory.* When combinations of cages and skips are used in the same compartment, the cages shall be enclosed to protect personnel from flying material and the hoist speed reduced to man-speed as defined in standard 56.19-61, but not to exceed 1,000 feet per minute. Muck shall not be hoisted with personnel during shift changes.

56.19-73 *Mandatory.* Rock or supplies shall not be hoisted in the same shaft as men during shift changes, unless the compartments and dumping bins are partitioned to prevent spillage into the cage compartment.

56.19-74 *Mandatory.* Persons shall not ride the bail, rim, bonnet, or crosshead of any shaft conveyance except when necessary for inspection and maintenance, and then only when suitable protection for persons is provided.

56.19-75 *Mandatory.* Open hooks shall not be used to hoist buckets or other conveyances.

56.19-76 *Mandatory.* When men are hoisted in buckets, speeds shall not exceed 500 feet per minute, and shall not exceed 200 feet per minute when within 100 feet of the intended station.

56.19-77 *Mandatory.* Buckets shall be stopped about 15 feet from the shaft bottom to await a signal from one of the crew on the bottom for further lowering.

56.19-78 *Mandatory.* All buckets shall be stopped after being raised about 3 feet above the shaft bottom. A bucket shall be stabilized before a hoisting signal is given to continue hoisting the bucket to the crosshead. After a hoisting signal is given, hoisting to the crosshead shall be at a minimum speed. The signaling device shall be attended constantly until a bucket reaches the guides. When persons are hoisted, the signaling devices shall be attended until the crosshead has been engaged.

56.19-79 *Mandatory.* Where mine cars are hoisted by cage or skip, means for blocking cars shall be provided at all landings and also on the cage.

56.19-80 *Mandatory.* When tools, timbers, or other materials are being lowered or raised in a shaft by means of a bucket, skip, or cage, they shall be secured or so placed that they will not strike the sides of the shaft.

56.19-81 *Mandatory.* When conveyances controlled by a hoist operator are not in use, they shall be released and the conveyances shall be raised or lowered a suitable distance to prevent persons from boarding or loading the conveyances.

56.19-82 [Reserved]

56.19-83 *Mandatory.* A manually operated device shall be installed on each electric hoist that will allow the conveyance or counterbalance to be removed from an overtravel position. Such device shall not release the brake, or brakes, holding the overtravelled conveyance or counterbalance until sufficient drive motor torque has been developed to assure movement of the conveyance or counterbalance in the correct direction only.

56.19-84 through 56.19-89 [Reserved]

SIGNALING

56.19-90 *Mandatory.* There shall be at least two effective approved methods of signaling between each of the shaft stations and the hoist room, one of which shall be a telephone or speaking tube.

56.19-91 *Mandatory.* Hoist operators shall accept hoisting instructions only by the regular signaling system unless it is out of order. In such an event, and during other emergencies, the hoist operator shall accept instructions to direct movement of the conveyances only from authorized persons.

56.19-92 *Mandatory.* A method shall be provided to signal the hoist operator from cages or other conveyances at any point in the shaft.

56.19-93 *Mandatory.* A standard code of hoisting signals shall be adopted and used at each mine. The movement of a shaft conveyance on a "one bell" signal is prohibited.

56.19-94 *Mandatory.* A legible signal code shall be posted prominently in the hoist house within easy view of the hoistman, and at each place where signals are given or received.

56.19-95 *Mandatory.* Hoisting signal devices shall be positioned within easy reach of persons on the shaft bottom or constantly attended by a person stationed on the lower deck of the sinking platform.

56.19-96 *Mandatory.* Any person responsible for receiving or giving signals for cages, skips, and man trips when men or materials are being transported shall be familiar with the posted signaling code.

56.19-97 through 56.19-99 [Reserved]

SHAFTS

56.19-100 *Mandatory.* Shaft landings shall be equipped with substantial safety gates so constructed that materials will not go through or under them; gates shall be closed except when loading or unloading shaft conveyances.

56.19-101 *Mandatory.* Positive stopblocks or a derail switch shall be installed on all tracks leading to a shaft collar or landing.

56.19-102 *Mandatory.* A means shall be provided to guide the movement of a shaft conveyance.

56.19-103 *Mandatory.* Dumping facilities and loading pockets shall be constructed so as to minimize spillage into the shaft.

56.19-104 *Mandatory.* Suitable clearance at shaft stations shall be provided to allow safe movement of persons, equipment and materials.

56.19-105 *Mandatory.* A safe means of passage around open shaft compartments shall be provided on landings with more than one entrance to the shaft.

56.19-106 *Mandatory.* Shaft sets shall be kept in good repair and clean of hazardous material.

56.19-107 *Mandatory.* Hoistmen shall be informed when men are working in a compartment affected by that hoisting operation and a "Men Working in Shaft" sign shall be posted at the hoist.

56.19-108 *Mandatory.* When men are working in a shaft "Men Working in Shaft" signs shall be posted at all devices controlling hoisting operations that may endanger such men.

56.19-109 *Mandatory.* Shaft inspection and repair work in vertical shafts shall be performed from substantial platforms equipped with bonnets or equivalent overhead protection.

56.19-110 *Mandatory.* A substantial bulkhead or equivalent protection shall be provided above men at work deepening a shaft.

56.19-111 *Mandatory.* Substantial fixed ladders shall be provided from the collar to as near the shaft bottom as practical during shaft-sinking operations, or an escape hoist powered by an emergency power source shall be provided. When persons are on the shaft bottom, a chain ladder, wire rope ladder, or other extension ladders shall be used from the fixed ladder or lower limit of the escape hoist to the shaft bottom.

56.19-112 through 56.19-119 [Reserved]

INSPECTION AND MAINTENANCE

56.19-120 *Mandatory.* A systematic procedure of inspection, testing, and maintenance of shaft and hoisting equipment shall be developed and followed. If it is found or suspected that any part is not functioning properly, the hoist shall not be used until the malfunction has been located and repaired or adjustments have been made.

56.19-121 *Mandatory.* Complete records shall be kept for three years of inspections, tests, and maintenance of shafts and hoisting equipment.

56.19-122 *Mandatory.* Parts used to repair hoists shall have properties that will insure the proper and safe function of the hoist.

56.19-123 *Mandatory.* Wire ropes shall be lubricated or treated with dressing as recommended or approved by the rope manufacturer.

56.19-124 *Mandatory.* Hoist ropes other than those on friction hoists shall be cut off at least six (6) feet above the highest connection to the conveyance at time intervals not to exceed one (1) year unless a shorter time is required by standard 56.19-126, or by conditions of use. The portion of the rope that is cut off shall be examined and inspected by a competent person for damage, corrosion, wear and fatigue.

56.19-125 *Mandatory.* Hoist ropes wound in multiple layers shall have a length cut off at the drum end at least three (3) times during the anticipated life of the rope and whenever necessary as required by standard 56.19-126 to distribute the wear at change-of-layer and crossover points. The length of rope cut off shall not be a whole number multiple of the circumference of the drum.

56.19-126 *Mandatory.* Hoist ropes shall be examined over the entire active length at least every month to evaluate wear and possible damage. When such examinations or other inspections reveal that the rope is worn, and at least every six (6) months, caliper measurements or nondestructive tests shall be made at the following locations:

(a) Wherever wear is evident;

(b) Immediately above the socket or clips and above the safety connection;

(c) Where the rope rests on the sheaves;

(d) Where the ropes leave the drums when the conveyances are at the regular stopping point;

(e) Where a layer of rope begins to overlap another layer on the drum; and

(f) At 100 foot intervals (measurements shall be made midway between the last previously calipered points).

56.19-127 [Reserved]

56.19-128 *Mandatory.* Ropes shall not be used for hoisting when they have:

(a) More than six broken wires in any lay;

(b) Crown wires worn to less than 65 percent of the original diameter;

(c) A marked amount of corrosion or distortion; and

(d) A combination of similar factors individually less severe than those above but which in aggregate might create an unsafe condition.

56.19-129 *Mandatory.* Hoistmen shall examine their hoists and shall test overtravel, deadman controls, position indicators, and braking mechanisms at the beginning of each shift.

56.19-130 *Mandatory.* Before hoisting persons and to assure that the hoisting compartments are clear of obstructions, empty hoist conveyances shall be operated at least one round trip after—

(a) Any hoist or shaft repairs or related equipment repairs that might restrict or obstruct conveyance clearance;

(b) Any oversize or overweight material or equipment trips that might restrict or obstruct conveyance clearance;

(c) Blasting in or near the shaft that might restrict or obstruct coveyance clearance; or

(d) Remaining idle for one shift or longer.

56.19-131 *Mandatory.* Hoist conveyance connections shall be inspected at least once during any 24-hour period that the conveyance is used for hoisting persons.

56.19-132 *Mandatory.* (a) A performance drop test of hoist conveyance safety catches shall be made at the time of installation, or prior to installation, in a mockup of the actual installation. The test shall be certified to in writing by the manufacturer or by a registered professional engineer performing the test.

(b) After installation and before use, and at the beginning of any seven (7) day period during which the conveyance is to be used, the conveyance shall be suitably rested and the hoist rope slackened to test for the unrestricted functioning of the safety catches and their activating mechanisms.

(c) The safety catches shall be inspected by a competent person at the beginning of any 24-hour period that the conveyance is to be used.

56.19-133 *Mandatory.* Shafts that have not been inspected within the past 7 days shall not be used until an inspection has been conducted by a competent person.

56.19-134 *Mandatory.* Sheaves in operating shafts shall be inspected weekly and kept properly lubricated.

56.19-135 *Mandatory.* Rollers used in operating inclined shafts shall be lubricated, properly aligned, and kept in good repair.

OMB CONTROL No. 1219-0047, paragraph 56.19-57. (47 FR 14706, Apr. 6, 1982]

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12511, July 31, 1969, as amended at 35 FR 3670, Feb. 25, 1970; 35 FR 18590, Dec. 8, 1970; 37 FR 14372, July 19, 1972; 39 FR 24318, 24319, July 1, 1974; 41 FR 23615, June 10, 1976; 42 FR 29421, June 8, 1977; 42 FR 57041, Oct. 31, 1977; 44 FR 31916, June 1, 1979; 44 FR 48525, Aug. 17, 1979; 44 FR 50571, Aug. 28, 1979; 44 FR 68828, Nov. 30, 1979; 45 FR 68935, Oct. 17, 1980; 47 FR 14706, Apr. 6, 1982]

§ 56.20 Miscellaneous.

56.20-1 *Mandatory.* Intoxicating beverages and narcotics shall not be permitted or used in or around mines. Persons under the influence of alcohol or narcotics shall not be permitted on the job.

56.20-2 *Mandatory.* An adequate supply of potable drinking water shall be provided at all active working areas.

(a) The common drinking cup and containers from which drinking water must be dipped or poured are prohibited.

(b) Where single service cups are supplied, a sanitary continer for unused cups and a receptacle for used cups shall be provided.

(c) When water is cooled by ice, the ice shall either be of potable water or shall not come in contact with the water.

(d) Potable water outlets shall be posted.

(e) Potable water systems shall be constructed to prevent backflow or backsiphonage of non-potable water.

56.20-3 *Mandatory.* At all mining operations: (a) Workplaces, passageways, storerooms, and service rooms shall be kept clean and orderly. (b) The floor of every workplace shall be maintained in a clean and, so far as possible, a dry condition. Where wet processes are used, drainage shall be maintained, and false floors, platforms, mats, or other dry standing places shall be provided where practicable. (c) Every floor, working place, and passageway shall be kept free from protruding nails, splinters, holes, or loose boards, as practicable.

56.20-4 [Reserved]

56.20-5 *Mandatory.* Carbon tetrachloride shall not be used.

56.20-6 and 56.20-7 [Reserved]

56.20-8 *Mandatory.* (a) Toilet facilities shall be provided at locations that are compatible with the mine operations and that are readily accessible to mine personnel.

(b) The facilities shall be kept clean and sanitary. Separate toilet facilities shall be provided for each sex except where toilet rooms will be occupied by no more than one person at a time and can be locked from the inside.

56.20-9 *Mandatory.* Dusts suspected of being explosive shall be tested for explosibility. If tests prove positive, appropriate control measures shall be taken.

56.20-10 *Mandatory.* If failure of a water or silt retaining dam will create a hazard, it shall be of substantial construction and inspected at regular intervals.

56.20-11 *Mandatory.* Areas where health or safety hazards exist that are not immediately obvious to employees shall be barricaded, or warning signs shall be posted at all approaches. Warning signs shall be readily visible, legible, display the nature of the hazard, and any protective action required.

56.20-12 *Mandatory.* Toxic materials used in conjunction with or discarded from mining or milling of a product shall be plainly marked or labeled so as to positively identify the nature of the hazard and the protective action required.

56.20-13 *Mandatory.* Receptacles with covers shall be provided at suitable locations and used for the disposal of waste food and associated materials. They shall be emptied frequently and shall be maintained in a clean and sanitary condition.

56.20-14 *Mandatory.* No person shall be allowed to consume or store food or beverages in a toilet room nor in any area exposed to a toxic material.

[34 FR 12511, July 31, 1969, as amended at 35 FR 3670, Feb. 25, 1970; 39 FR 24318, July 1, 1974; 42 FR 29422, June 8, 1977; 42 FR 57042, Oct. 31, 1977; 44 FR 31916, June 1, 1979; 44 FR 48526, Aug. 17, 1979; 45 FR 68935, Oct. 17, 1980]

§ 56.26 Procedures.

NOTIFICATION OF COMMENCEMENT OF OPERATIONS AND CLOSING OF MINES

56.26-1 *Mandatory.* The owner, operator, or person in charge of any metal and nonmetal mine shall notify the nearest Mine Safety and Health Administration Metal and Nonmetal Mine Safety and Health Subdistrict Office before starting operations, of the approximate or actual date mine operation will commence. The notification shall include the mine name, location, the company name, mailing address, person in charge, and whether operations will be continuous or intermittent.

When any mine is closed, the person in charge shall notify the nearest subdistrict office as provided above and indicate whether the closure is temporary or permanent.

[38 FR 23381, Aug. 29, 1973, as amended at 43 FR 12318, Mar. 24, 1978]

PART 57—SAFETY AND HEALTH STANDARDS—METAL AND NONMETAL UNDERGROUND MINES

Sec.

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AUTHORITY: Secs. 301(a), 301(b)(2), 301(c)(3) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317-1319 (30 U.S.C. 961(a), (b)(2), (c)(3) (Supp. I, 1977)), and 29 U.S.C. 557a (Supp. I, 1977); sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 83 Stat. 803 (30 U.S.C. 957 (1976 ed.)); sec. 6 of the Federal Metal and Nonmetallic Mine Safety Act (repealed 1977), Pub. L. 89-577, 80 Stat. 774 (30 U.S.C. 725 (1976 ed.)), (repealed sec. 306(a), Pub. L. 95-164, 91 Stat. 1322, but see sec. 301(b)(1), Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961(b)(1) (Supp. I, 1977)), unless otherwise noted.

SOURCE: 34 FR 12517, July 31, 1969, unless otherwise noted.

NOTE: Nomenclature changes to this part appear at 43 FR 12319, Mar. 24, 1978; 43 FR 43458, Sept. 26, 1978.

§ 57.1 Purpose and scope.

The regulations in this part are promulgated pursuant to section 6 of the Federal Metal and Nonmetallic Mine Safety Act (30 U.S.C. 725) and prescribe health and safety standards for the purpose of the protection of life, the promotion of health and safety, and the prevention of accidents in underground metal and nonmetallic mines which are subject to that Act. Each standard which is preceded by the word "Mandatory" is a mandatory standard. The violation of a mandatory standard will subject an operator to an order or notice under section 8 of the Act (30 U.S.C. 727). Those regulations in each subpart appearing under the heading "General—Surface and Underground" apply both to the underground and surface operations of underground mines; those appearing under the heading "Surface Only" apply only to the surface operations of underground mines: those appearing under the heading "Underground Only" apply only to the underground operations of underground mines.

§ 57.2 Definitions.

As used in this part:

"Abandoned mine" means all work has stopped on the mine premises and an office with a responsible person in charge is no longer maintained at the mine.

"Abandoned workings" means deserted mine areas in which further work is not intended.

"Active workings" means areas at, in, or around a mine or plant where men work or travel.

"American Table of Distances" means the current edition of "The American Table of Distances for Storage of Explosives" published by the Institute of Makers of Explosives.

"Approved" means tested and accepted for a specific purpose by a nationally recognized agency.

"Authorized person" means a person approved or assigned by mine management to perform a specific type of duty or duties or to be at a specific location or locations in the mine.

"Auxiliary fan" means a fan used to deliver air to a working place off the main airstream; generally used with ventilation tubing.

"Barricaded" means obstructed to prevent the passage of persons, vehicles, or flying materials.

"Berm" means a pile or mound of material capable of restraining a vehicle.

"Blasting agent" means any substance classified as a blasting agent by the Department of Transportation in 49 CFR § 173.114(a) (44 FR 31182, May 31, 1979) which is incorporated by reference. This document is available for inspection at each Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration, and may be obtained from the U.S. Government Printing Office, Washington, D.C. 20402.

"Blasting area" means the area near blasting operations in which concussion or flying material can reasonably be expected to cause injury.

"Blasting cap" means a detonator which is initiated by a safety fuse.

"Blasting circuit" means the electrical circuit used to fire one or more electric blasting caps.

"Capped fuse" means a length of safety fuse to which a blasting cap has been attached.

"Blasting switch" means a switch used to connect a power source to a blasting circuit.

"Booster fan" means a fan installed in the main airstream or a split of the main airstream to increase airflow through a section or sections of a mine.

"Booster" means any unit of explosive or blasting agent used for the purpose of perpetuating or intensifying an initial detonation.

"Capped fuse" means a length of safety fuse to which a blasting cap has been attached.

"Capped primer" means a package or cartridge of explosives which is specifically designed to transmit detonation to other explosives and which contains a detonator.

"Circuit breaker" means a device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent setting without injury to itself when properly applied within its rating.

"Combustible" means capable of being ignited and consumed by fire.

"Company official" means a member of the company supervisory or technical staff.

"Competent person" means a person having abilities and experience that fully qualify him to perform the duty to which he is assigned.

"Conductor" means a material, usually in the form of a wire, cable, or bus bar, capable of carrying an electric current.

" Delay connector" means a nonelectric short interval delay device for use in delaying blasts which are initiated by detonating cord.

"Detonating cord" means a flexible cord containing a solid core of high explosives.

"Detonator" means any device containing a detonating charge that is used to initiate an explosive and includes but is not limited to blasting caps, electric blasting caps and nonelectric instantaneous or delay blasting caps.

"Distribution box" means a portable apparatus with an enclosure through which an electric circuit is carried to one or more cables from a single incoming feed line; each cable circuit being connected through individual overcurrent protective devices.

"Electric blasting cap" means a detonator designed for and capable of being initiated by means of an electric current.

"Electrical grounding" means to connect with the ground to make the earth part of the circuit.

"Employee" means a person who works for wages or salary in the service of an employer.

"Employer" means a person or organization which hires one or more persons to work for wages or salary.

"Escapeway" means a passageway by which persons may leave a mine.

"Explosive" means any substance classified as an explosive by the Department of Transportation in 49 CFR 173.53, 173.88 and 173.100 which are incorporated by reference. Title 49 CFR is available for inspection at each Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration, and may be obtained from the U.S. Government Printing Office, Washington, D.C. 20402.

"Face or bank" means that part of any mine where excavating is progressing or was last done.

"Fire door" means an openable closure for a passageway, shaft, or other mine opening to serve as barrier to fire, the effects of fire, and air leakage. A fire door shall be constructed of materials and assembled so as to be equivalent to a door having a fire resistance rating of 1½ hours or greater, and on exposure to fire on one side for 30 minutes, the temperature on the unexposed side shall not exceed 250° F. as determined by a nationally recognized testing agency in accordance with "Standard Method of Fire Tests of Door Assemblies", National Fire protection Association (NFPA) Code No. 252. 1972, or equivalent. The framework assembly of a fire door and the surrounding bulkhead, if any, shall be at least equivalent to the fire door in fire and air-leakage resistance, and in physical strength. NFPA code No. 252 is hereby incorporated by reference and made a part hereof. This publication may be examined in any Metal and Nonmetal Mine Health and Safety Subdistrict Office, Mine Safety and Health Administration, or may be obtained from the National Fire protection Association, 470 Atlantic Avenue, Boston, Mass. 02210.

"Flammable" means capable of being easily ignited and of burning rapidly.

"Flash point" means the minimum temperature at which sufficient vapor is released by a liquid or solid to form a flammable vapor-air mixture at atmospheric pressure.

"Highway" means any public street, public alley or public road.

"High potential" means more than 650 volts.

"Hoist" means a power driven windlass or drum used for raising ore, rock, or other material from a mine, and for lowering or raising men and material.

"Igniter cord" means a fuse, cordlike in appearance, which burns progressively along its length with an external flame at the zone of burning, and is used for lighting a series of safety fuses in the desired sequence.

"Insulated" means separated from other conducting surfaces by a dielectric substance permanently offering a high resistance to the passage of current and to disruptive discharge through the substance. When any substance is said to be insulated, it is understood to be insulated in a manner suitable for the conditions to which it is subjected. Otherwise, it is, within the purpose of this definition, uninsulated. Insulating covering is one means for making the conductor insulated.

"Insulation" means a dielectric substance offering a high resistance to the passage of current and to a disruptive discharge through the substance.

"Lay" means the distance parallel to the axis of the rope in which a strand makes one complete turn about the axis of the rope.

"Low potential" means 650 volts or less.

"Magazine" means a facility for the storage of explosives, blasting agents, or detonators.

"Main fan" means a fan that controls the entire airflow of the mine, or the airflow of one of the major air circuits.

"Major electrical installation" means an assemblage of stationary electrical equipment for the generation, transmission, distribution, or conversion of electrical power.

"Man trip" means a trip on which men are transported to and from a work area. "Mill" includes any ore mill, sampling works, concentrator, and any crushing, grinding, or screening plant used at, and in connection with, an excavation or mine.

"Mine opening" means any opening or entrance from the surface into a mine.

"Misfire" means the complete or partial failure of a blasting charge to explode as planned.

"Multipurpose dry-chemical fire extinguisher" means a listed or approved multipurpose dry-chemical fire extinguisher having a minimum rating of 2-A:10-B:C, by Underwriters Laboratories, Inc., and containing a minimum of 4.5 pounds of dry-chemical agent.

"Non-electric delay blasting cap" means a detonator with an integral delay element and capable of being initiated by miniaturized detonating cord.

"Overburden" means material of any nature, consolidated or unconsolidated, that overlies a deposit of useful materials or ores that are to be mined.

"Overload" means that current which will cause an excessive or dangerous temperature in the conductor or conductor insulation.

"Permissible" means a machine, material, apparatus, or device which has been investigated, tested, and approved by the Bureau of Mines or the Mine Safety and Health Administration, and is maintained in permissible condition.

"Potable water" means water which shall meet the applicable minimum health requirements for drinking water established by the State or community in which the mine is located or by the Environmental Protection Agency in 40 CFR Part 141, pages 169-182 revised as of July 1, 1977. Where no such requirements are applicable, the drinking water provided shall conform with the Public Health Service Drinking Water Standards, 42 CFR Part 72, Subpart J, pages 527-533, revised as of October 1, 1976. Publications to which references are made in this definition are hereby made a part hereof. These incorporated publications are available for inspection at each Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration.

"Powder chest" means a substantial, nonconductive portable container equipped with a lid and used at blasting sites for explosives other than blasting agents.

"Primer" means a unit, package, or cartridge of explosives used to initiate other explosives or blasting agents, and which contains a detonator.

"Reverse-current protection" means a method or device used on direct-current circuits or equipment to prevent the flow of current in a reverse direction.

"Roll protection" means a framework, safety canopy or similar protection for the operator when equipment overturns.

"Safety can" means an approved container, of not over 5 gallons capacity, having a spring-closing lid and spout cover.

"Safety fuse" means a flexible cord containing an internal burning medium by which fire is conveyed at a continuous and uniform rate for the purpose of firing blasting caps or a black powder charge.

"Safety switch" means a sectionalizing switch that also provides shunt protection in blasting circuits between the blasting switch and the shot area.

"Scaling" means removal of insecure material from a face or highwall.

"Secondary safety connection" means a second connection between a conveyance and rope, intended to prevent the conveyance from running away or falling in the event the primary connection fails.

"Shaft" means a vertical or inclined shaft, a slope, incline, or winze.

"Short circuit" means an abnormal connection of relatively low resistance, whether made accidentally or intentionally, between two points of different potential in a circuit.

"Slurry" (as applied to blasting). See "Water gel."

"Stray current" means that portion of a total electric current that flows through paths other than the intended circuit.

"Substantial construction" means construction of such strength, material, and workmanship that the object will withstand all reasonable shock, wear, and usage to which it will be subjected.

"Suitable" means that which fits, and has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstance.

"Travelway" means a passage, walk or way regularly used and designated for persons to go from one place to another.

"Trip light" means a light displayed on the opposite end of a train from the locomotive or engine.

"Water gel" or "Slurry" (as applied to blasting) means an explosive or blasting agent containing substantial portions of water.

"Wet drilling" means the continuous application of water through the central hole of hollow drill steel to the bottom of the drill hole.

"Working level" (WL) means any combination of the short-lived radon daughters in one liter of air that will result in ultimate emission of 1.3×10^5 MeV (million electron volts) of potential alpha energy, and exposure to these radon daughters over a period of time is expressed in terms of "working level months" (WLM). Inhalation of air containing a radon daughter concentration of 1 WL for 173 hours results in an exposure of 1 WLM."

"Working place" means any place in or about a mine where work is being performed.

[34 FR 12517, July 31, 1969, as amended at 35 FR 3671, Feb. 25, 1970; 37 FR 14369, July 19, 1972; 39 FR 24319, July 1, 1974; 42 FR 29422, June 8, 1977; 42 FR 57042, Oct. 31, 1977; 43 FR 54067, Nov. 17, 1978; 44 FR 31917, June 1, 1979; 44 FR 48544, Aug. 17, 1979]

§ 57.3 Ground control.

SURFACE ONLY

57.3-1 *Mandatory.* Standards for the safe control of pit walls, including the overall slope of the pit wall, shall be established and followed by the operator. Such standards shall be consistent with prudent engineering design, the nature of the ground and the kind of material and mineral mined, and the ensuring of safe working conditions according to the degree of slope. Mining methods shall be selected which will ensure wall and bank stability, including benching as necessary to obtain a safe overall slope.

57.3-2 *Mandatory.* Loose, unconsolidated material shall be stripped for a safe distance, but in no case less than 10 feet, from the top of pit or quarry walls, and the loose, unconsolidated material shall be sloped to the angle of repose.

57.3-3 *Mandatory.* To ensure safe operation, the width and height of benches shall be governed by the type of equipment to be used and the operation to be performed.

57.3-4 *Mandatory.* Safe means for scaling pit-banks shall be provided. Hazardous banks shall be scaled before other work is performed in the hazardous bank area.

57.3-5 *Mandatory.* Men shall not work near or under dangerous banks. Overhanging banks shall be taken down immediately and other unsafe ground conditions shall be corrected promptly, or the areas shall be barricaded and posted.

57.3-6 *Mandatory.* Men shall approach from above loose rock and areas to be scaled and shall scale from a safe location.

57.3-7 [Reserved]

57.3-8 *Mandatory.* The supervisor, or a competent person designated by him, shall examine working areas and faces for unsafe conditions at least at the beginning of each shift and after blasting. Any unsafe condition found shall be corrected before any further work is performed at the immediate area or face at which the unsafe condition exists.

57.3-9 *Mandatory.* Men shall examine their working places before starting work and frequently thereafter, and any unsafe condition shall be corrected.

57.3-10 and 57.3-11 [Reserved]

57.3-12 *Mandatory.* Men shall not work between equipment and the pit wall or bank where the equipment may hinder escape from falls or slides of the bank.

57.3-13 through 57.3-19 [Reserved]

UNDERGROUND ONLY

57.3-20 *Mandatory.* Ground support shall be used if the operating experience of the mine, or any particular area of the mine, indicates that it is required. If it is required, support, including timbering, rock bolting, or other methods shall be consistent with the nature of the ground and the mining method used.

57.3-21 [Reserved]

57.3-22 *Mandatory.* Miners shall examine and test the back, face, and rib of their working places at the beginning of each shift and frequently thereafter. Supervisors shall examine the ground conditions during daily visits to insure that proper testing and ground control practices are being followed. Loose ground shall be taken down or adequately supported before any other work is done. Ground conditions along haulageways and travelways shall be examined periodically and scaled or supported as necessary.

57.3-23 through 57.3-25 [Reserved]

57.3-26 *Mandatory.* Timbers used for support of ground in active workings shall be set, blocked, or blocked and wedged so that a tight fit is achieved. Damaged, loosened, or dislodged timbers which create a hazardous condition shall be promptly repaired or replaced.

57.3-27 and 57.3-28 [Reserved]

57.3-29 *Mandatory.* Shaft pillars or other support systems shall have sufficient strength to support operating shafts.

57.3-30 and 57.3-31 [Reserved]

57.3-32 When needed, rock bolts should be installed as soon as possible after an area is exposed.

57.3-33 *Mandatory.* Calibrated torque meters or torque wrenches shall be available at mines where rock bolts are used for ground control. Periodic tests shall be made to determine the torque meter or torque wrench accuracy. Periodic testing of torque wrenches means when repaired or at least annually, and whenever a torque wrench is suspected of being inaccurate or damaged.

57.3-34 [Reserved]

57.3-35 *Mandatory.* Operators of mines that have experienced rock bursts within the mine shall develop a comprehensive rock burst detection plan applicable to current conditions in that mine within 90 days after promulgation of this standard or, thereafter, within 90 days after a rock burst has been experienced. This plan shall be updated from time to time as conditions and available technology warrant. This comprehensive rock burst detection plan shall be available to the Secretary or his duly authorized representative, and to mine employees.

57.3-36 through 57.3-49 [Reserved]

57.3-50 *Mandatory.* Material, other than hanging material, to be broken by secondary drilling and blasting, or by any other method shall be positioned or blocked to prevent hazardous movement before persons commence breaking operations. Persons who perform those operations shall work from a location where, if movement of material occurs, those persons will not be endangered.

GENERAL—SURFACE AND UNDERGROUND

57.3-51 *Mandatory.* Where manual scaling may be required at a work place, a scaling bar of sufficient length to place the user out of danger of falling material shall be provided. The scaling bar shall be blunt on the end held by the user. Picks or other short tools shall not be used for scaling when their use places the user in danger of falling material.

57.3-52 [Reserved]

57.3-53 *Mandatory.* When rock bolts are used as a means of ground support, anchorage test procedures shall be established and tests shall be conducted to determine the anchorage capacity of rock-bolt installations. Test results shall be in writing and made available to the Secretary or his duly authorized representative.

57.3-54 *Mandatory.* Rock bolts used as a means of ground support and which require torquing shall be torqued to a value within the range determined from information obtained by tests in the strata in which the rock-bolt assembly is used. In no case shall the applied torque cause a bolt tension that would exceed the yield point or anchorage capacity of the rock-bolt assembly being used.

57.3-55 *Mandatory.* When installing poing-anchor rock bolts:

(a) A torque test shall be conducted on at least every fourth installed bolt.

(b) Torque testing shall be conducted immediately after bolt installation.

(c) If the recommended torque has not been achieved, the equipment used to install the bolt shall be adjusted and the next bolt installed shall then be tested.

(d) If the recommended torque has not been achieved on the majority of bolts installed in a working place through equipment adjustment, supplemental support equivalent to longer roof bolts with adequate anchorage, steel or wood sets, or cribs shall be installed.

57.3-56 *Mandatory.* Rock bolt hole drill bits shall be easily identifiable by sight or feel and diameters shall be within a tolerance of ±0.030 inches of the manufacturer's recommended hole diameter for the anchor used.

57.3-57 *Mandatory.* If used in rock-bolt assemblies to reduce friction between the bolt head and the bearing plate, washers shall: (a) Have hardness in the range of 35-45 HRC (Hardness Rockwell C Scale). (b) Conform to the shape of the bolt head and bearing plate. (c) Have sufficient strength to withstand loads up to the yield point of the rock bolt.

57.3-58 *Mandatory.* When rock bolts are needed for ground support, they shall be installed as soon as practicable after an area is exposed.

OMB CONTROL No. 1219-0035, paragraph 57.3-53. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12517, July 31, 1969, as amended at 35 FR 3671, Feb. 25, 1970; 35 FR 18591, Dec. 8, 1970; 39 FR 24319, July 1, 1974; 42 FR 29422, June 8, 1977; 42 FR 57042, Oct. 31, 1977; 44 FR 48526, Aug. 17, 1979; 47 FR 14706, Apr. 6, 1982]

§ 57.4 Fire prevention and control.

GENERAL—SURFACE AND UNDERGROUND

57.4-1 *Mandatory.* No person shall smoke or use an open flame—

(a) Where flammable solvents, liquids, fluids, or other flammable materials are stored, transported, handled, or used; or

(b) Where oil or grease is stored, transported, handled, or used, if smoking or the use of an open flame may cause a fire, or

(c) Within an unsafe distance of any area where smoking or the use of an open flame may cause a fire or an explosion.

57.4-2 *Mandatory.* Signs warning against smoking and open flames shall be posted so they can be readily seen in areas or places where fire or explosion hazards exist.

57.4-3 *Mandatory.* Areas surrounding electric substations and unburied tanks used for the storage of flammable or combustible liquids shall be free of combustible materials (including dry vegetation) for a distance of at least 25 feet.

57.4-4 *Mandatory.* Flammable liquids shall be stored in accordance with standards of the National Fire Protection Association or other recognized agencies approved by the Mine Safety and Health Administration. Small quantities of flammable liquids drawn from storage shall be kept in appropriately labeled safety cans.

57.4-5 *Mandatory.* Effective February 13, 1980, fixed unburied tanks used for the storage of flammable or combustible liquids shall be securely mounted on firm foundations. Where necessary to prevent leaks caused by tanks settling, piping shall be provided with flexible connections or other special fittings.

57.4-6 [Reserved]

57.4-7 *Mandatory.* Means shall be provided to remove or control spilled flammable or combustible liquids.

57.4-8 *Mandatory.* Fuel lines shall be equipped with valves to cut off fuel at the source and shall be located and maintained to minimize fire hazards.

57.4-9 *Mandatory.* All heat sources, including lighting equipment, capable of producing combustion shall be insulated or isolated from combustible materials.

57.4-10 *Mandatory.* Power wires and cables shall be adequately insulated where they pass through doors or walls or where they present a fire hazard.

57.4-11 *Mandatory.* Abandoned electrical circuits shall be deenergized and isolated so that they cannot become energized inadvertently.

57.4-12 *Mandatory.* All flammable and combustible waste materials, grease, lubricants or flammable liquids shall not be allowed to accumulate where they can create a fire hazard.

57.4-13 *Mandatory.* In areas where materials such as oily waste or oily rags create a fire hazard, the materials shall be placed in covered metal containers until disposed of properly.

57.4-14 *Mandatory.* Solvents with flash points lower than 100° F. (38° C.) shall not be used for cleaning.

57.4-15 *Mandatory.* Solvents shall not be used near an open flame or other ignition source, or near any source of heat, or in an atmosphere that can elevate the temperature of the solvent above the flash point.

57.4-16 *Mandatory.* Drip pans shall be provided to catch leakage or spillage whenever combustible or flammable liquids are dispensed in a place or manner which may create a fire hazard. Floor areas where drip pans are used shall be cleaned immediately after spills.

57.4-17 [Reserved]

57.4-18 *Mandatory.* Oxygen cylinders shall not be stored in rooms or areas used or designated for oil or grease storage.

57.4-19 *Mandatory.* Gages and regulators used with oxygen or acetylene cylinders shall be kept clean and free of oil and grease.

57.4-20 *Mandatory.* Battery-charging stations shall be located in well-ventilated areas.

57.4-21 *Mandatory.* Equipment powered by internal combustion engines (except diesel engines) where the fuel tank is an integral part of the equipment, shall be shutoff and stopped before being fueled.

57.4-22 *Mandatory.* Each mine shall have available or be provided with suitable firefighting equipment adequate for the size of the mine.

57.4-23 *Mandatory.* Firefighting equipment which is provided on the mine property shall be strategically located, readily accessible, plainly marked, properly maintained, and inspected periodically. Records shall be kept of such inspections.

57.4-24 *Mandatory.* Fire extinguishers and fire suppression devices shall be:

(a) Of the appropriate type for the particular fire hazard involved.

(b) Adequate in number and size for the particular fire hazard involved.

(c) Replaced with a fully charged extinguisher or device, or recharged immediately, after any discharge is made from the extinguisher or device.

(d) Inspected, tested, and maintained at regular intervals according to the manufacturer's recommendations.

(e) Approved by the Underwriter's Laboratories, Inc., or other competent testing agency acceptable to the Mine Safety and Health Administration.

57.4-25 *Mandatory.* Effective February 13, 1980, whenever fire hydrants are used, they shall be provided with—

(a) Uniform fittings;

(b) Readily available wrenches or keys to open the valves; and

(c) Readily available adapters that connect hydrant fittings to the hose equipment of local fire departments.

57.4-26 *Mandatory.* Water pipes, valves, outlets, hydrants, and hoses designated for fire fighting purposes shall be inspected every 90 days and tested annually.

57.4-27 *Mandatory.* Whenever self-propelled mobile equipment is used, such equipment shall be provided with a suitable fire extinguisher readily accessible to the equipment operator.

57.4-28 *Mandatory.* Welding, cutting, arc welding or soldering shall be performed by a competent person.

57.4-29 *Mandatory.* When welding or cutting, suitable precautions shall be taken to insure that smoldering metal or sparks do not result in a fire. Fire extinguishing equipment shall be immediately available at the site.

57.4-30 through 57.4-32 [Reserved]

57.4-33 *Mandatory.* Valves on oxygen and acetylene tanks shall be kept closed when the contents are not being used.

57.4-34 [Reserved]

57.4-35 *Mandatory.* Before any heat is applied to pipelines or containers which have contained flammable or combustible substances, they shall be drained, ventilated, thoroughly cleaned of residual substances and filled with either an inert gas or, where compatible, filled with water.

57.4-36 through 57.4-38 [Reserved]

SURFACE ONLY

57.4-39A *Mandatory.* Effective February 13, 1980, storage buildings or rooms in which flammable or combustible liquids or other flammable materials are stored and which are within 100 feet of where miners normally work shall be well-ventilated and constructed of materials having a fire-resistance rating of no less than one (1) hour as tested under the appropriate National Fire Protection Association (NFPA) fire-resistance test or under a test of another approved testing agency.

57.4-39B *Mandatory.* Emergency fire fighting plans in combination with evacuation and rescue plans shall be established and coordinated with available fire fighting organizations. Emergency fire fighting drills shall be held for each shift at least once every six (6) months.

57.4-39C through 57.4-39Z [Reserved]

57.4-40 *Mandatory.* Fire alarm systems shall be provided and maintained in operating condition or adequate fire alarm procedures shall be established to warn promptly all persons endangered by a fire.

57.4-41 *Mandatory.* Every building or structure where persons normally work shall be provided with exits sufficient to permit the prompt escape of persons in case of fire.

57.4-42 *Mandatory.* (a) No combustible materials shall be permitted within 100 feet of main and booster fans and mine openings, except for one day's requirements of mine materials or supplies. However, such supplies or materials shall not be permitted within 25 feet of mine openings.

(b) In this standard, the phrase "combustible materials" includes dry vegetation which is within 25 feet of mine openings but does not include installed wiring, ground support and track support, headframes, any materials in transit, or any buildings and other structures in compliance with standard 57.4-43.

57.4-43 *Mandatory.* (a) Buildings and other similar structures, which are within 100 feet of mine openings used for intake air and mine openings that are designated escapeways in exhaust air, shall be constructed of materials having a fire-resistance rating of no less than one (1) hour as tested under the appropriate National Fire Protection Association (NFPA) fire-resistance test or under a test of another approved testing agency.

(b) An automatic fire suppression system may be substituted for the requirements of paragraph (a)—

(1) In buildings and structures occupied or in use on November 15, 1980, if the system is in operating condition by February 13, 1979; or

(2) In buildings and structures under construction on November 15, 1979, if the system is in operating condition prior to occupancy or use.

57.4-44 [Reserved]

57.4-45 *Mandatory.* Blacksmith shops shall be—

(a) Well ventilated and equipped with exhaust vents over the forge;

(b) Inspected specifically for smoldering fires at the end of each shift;

(c) Constructed of materials having a fire-resistance rating of no less than one (1) hour as tested under the appropriate National Fire Protection Association (NFPA) fire-resistance test or under a test of another approved testing agency; and

(d) Located at least 100 feet from the mine openings or fan installations, and not in buildings or snowsheds adjoining mine openings or fan installations unless fire doors and walls, constructed according to the requirements of paragraph (c) of this standard, are provided between the blacksmith shop and the mine openings or fan installations.

57.4-46 *Mandatory.* Gasoline, diesel fuel, liquefied petroleum gases, and other flammable liquids when not buried, shall not be stored within 100 feet of the following:

(a) Mine openings.

(b) Buildings or snowsheds connected to mine openings.

(c) Fan installations or housings.

(d) Hoist houses.

57.4-47 *Mandatory.* Belt conveyors shall be equipped with a safety switch capable of automatically stopping the drive pulley in the event of excessive slippage of the belt, where ignition of the belt could create a hazard to personnel. When it is necessary to operate the conveyor while temporarily bypassing the safety switch or any automatic function of the switch, a person shall attend the belt at the drive pulley.

57.4-48 *Mandatory.* All employees shall be instructed at least once each calendar year on fire alarm signals and applicable procedures to be followed in case of fire or other emergency. Records of instruction shall be kept for 2 years.

57.4-49 [Reserved]

UNDERGROUND ONLY

57.4-50 *Mandatory.* All flammable and combustible waste materials, grease, lubricants or flammable liquids shall not be allowed to accumulate where they can create a fire hazard.

57.4-51 *Mandatory.* Fire alarm systems adequate to warn all employees shall be provided and maintained in operating condition.

57.4-52 *Mandatory.* Gasoline shall not be stored underground, but may be used only to power internal combustion engines in nongassy mines that have multiple horizontal or inclined roadways from the surface large enough to accommodate vehicular traffic. Roadways and other openings shall not be supported or lined with combustible material. All roadways and other openings shall be connected with another opening every 100 feet by a passage large enough to accommodate any vehicle in the mine.

57.4-53 *Mandatory.* The use of liquefied petroleum gases shall be limited to maintenance work.

57.4-54 *Mandatory.* Oil, grease, or diesel fuel stored underground shall be kept in suitable tightly sealed containers in fire-resistant areas, at safe distances from explosives' magazines, electrical installations, and shaft stations.

57.4-55 *Mandatory.* Transformer stations, pump rooms, compressor rooms and similar installations, which are located in timbered areas or in areas where exposed rock is combustible, shall be provided with suitable fire protection.

57.4-56 [Reserved]

57.4-57 *Mandatory.* Effective November 12, 1980, trailing cables shall be flame-resistant in accordance with 30 CFR 18.64.

57.4-58 *Mandatory.* Fires shall not be built underground; open-flame torches and candles shall not be left underground.

57.4-59 and 57.4-60 [Reserved]

57.4-61A *Mandatory.* To prevent the spread of smoke or gas in the event of a fire, ventilation doors shall be installed at or near shaft stations of intake shafts and at any shaft designated as an escapeway under standard 57.11-53, or at other locations which provide equivalent protection. Effective February 13, 1980, the location (and relocation) of doors required by this standard shall be submitted to the District Manager for the district in which the mine is located, for review and approval by the Secretary.

Doors required by this standard shall be—

(a) Constructed and maintained in accordance with standard 57.5-31;

(b) Constructed according to the specifications within the definition of "fire door" in section 57.2, if located in a timbered area, in an area where the exposed rock is combustible, or in an area where a significant fire hazard is present;

(c) Provided with a means of remote closure unless other means of closing the door are assured;

(d) Constructed so that, once closed, they will not reopen as a result of a differential in air pressure;

(e) Constructed so that they can be opened from either side by one person, or provided with a man door that can be opened from either side; and

(f) Kept clear of obstructions and extraneous materials.

57.4-61B *Mandatory.* (a) To confine or prevent the spread of toxic gases from a fire originating in an underground shop, the mine operator shall install in each opening to the shop a fire door or bulkhead constructed in accordance with the definition of "fire door" contained in § 57.2.

(b) Each fire door shall be—

(1) Constructed so that, once closed, it will not reopen as a result of a differential in air pressure;

(2) Constructed so that it can be opened from either side by one person or be provided with a man door that can be opened from either side;

(3) Suitably airtight; and

(4) Kept clear of obstructions and extraneous materials.

(c) This standard does not apply when mine shop exhaust air is routed directly to an exhaust system in such a manner that personnel would not be exposed to toxic gases in the event of a fire originating in the underground shop.

57.4-62 *Mandatory.* Timber in mine entrances shall be fire-retardant to the extent that the flame spread rating shall be 25 or less for at least 200 feet inside the mine portal or collar, or the mine entrance shall be provided with fire protection capable of controlling a fire for at least 200 feet inside the mine portal or collar.

57.4-63 *Mandatory.* Waterline outlets located at shaft stations shall have at least one fitting suitably located for, and capable of, immediate connection to fire fighting equipment.

57.4-64 [Reserved]

57.4-65 [Reserved]

57.4-66 *Mandatory.* Suitable fire protection shall be provided at the head, tail, drive, and takeup pulleys of belt conveyors and at intervals along the belt line.

57.4-67 through 57.4-71 [Reserved]

57.4-72 *Mandatory.* Only trained mine rescue team members shall participate in rescue and fire fighting operations in advance of the fresh air base.

57.4-73 *Mandatory.* Mine evacuation drills shall be held for each shift once every 6 months. These evacuation drills shall involve all employees on each shift and shall include:

(a) Activation of the fire-alarm system.

(b) Evacuation of all men from their work areas to the surface or to designated central evacuation points at some time other than a shift change.

Record of such drills, showing the time and date, shall be kept for at least 2 years after each drill.

57.4-74 *Mandatory.* All employees involved in the escape and evacuation plan for an underground operation shall be instructed at least once each calendar year on current escape and evacuation plans, firealarm signals, and applicable procedures to be followed in case of fire or other emergency. New employees shall receive such instructions before going underground. Whenever an employee is assigned to work in another area of the mine he shall be instructed on the escapeway for that area at the time of such assignment. However, employees who normally work in more than one area of the mine shall be instructed at least once each calendar year in the location of escapeways for all areas of the mine in which they normally work or travel. Whenever a change is made in escape and evacuation plans and procedures for any area of the mine, all affected employees shall be instructed of such change. Records of instruction shall be kept for 2 years.

57.4-75 *Mandatory.* Belt conveyors shall be equipped with slippage and sequence switches.

57.4-76 *Mandatory.* Where welding or cutting with an arc or open flame, or thawing pipes electrically (excluding heat tape) or soldering with an open flame, a multipurpose dry-chemical fire extinguisher shall be provided.

57.4-77 *Mandatory.* Where welding or cutting with an arc or open flame, or thawing pipes electrically (excluding heat tape) within thirty five (35) feet, or where soldering with an open flame within ten (10) feet, of more than one (1) gallon of combustible liquid (unless the combustible liquid is in a closed noncombustible metal container) or more than fifty (50) pounds of non-fire-retardant wood, or more than ten (10) pounds of combustible plastic, the following precautions, in addition to a multipurpose dry-chemical fire extinguisher shall be taken:

(a) A second multipurpose dry-chemical fire extinguisher, or fire extinguishing equipment having equivalent extinguishing capability and appropriate for the particular hazard involved, shall be provided.

(b) The combustible materials and the area between them and the operation shall be wetted down (precautions shall be taken against electrical shock, where necessary) before and after the operation. If wetting down is not practical, then the combustibles shall be isolated by noncombustible material or the operation shall be shielded to insure that smoldering metal or sparks do not result in a fire.

(c) If the precautions in (b) are not practical, then a second person shall be present to observe and extinguish fires.

(d) Inspection(s) of the affected areas shall be made during the first hour after the operation is terminated. If the mine operator deems that working conditions and the degree of potential hazard warrant it, additional inspections shall be made or other extra-precautionary measures shall be taken.

57.4-78 *Mandatory.* Where welding or cutting with an arc or open flame, or thawing pipes electrically (excluding heat tape) in or within thirty-five (35) feet, or where soldering with an open flame in or within ten (10) feet, of a shaft, rise, or winze and where there is a risk that combustible materials may be ignited by falling sparks or heated material, the following precautions, in addition to a multipurpose dry-chemical fire extinguisher, shall be taken:

(a) A second multipurpose dry-chemical fire extinguisher, or fire extinguishing equipment having equivalent extinguishing capability and appropriate for the particular hazard involved, shall be provided.

(b) The combustible materials and the area between them and the operation shall be wetted down (precautions shall be taken against electrical shock, where necessary) before and after the operation. If wetting down is not practical, then the combustibles shall be isolated by noncombustible material or the operation shall be shielded to insure that smoldering metal or sparks do not result in a fire.

(c) Or, if practical, the opening immediately below or adjacent to the operation shall be covered or bulkheaded with a noncombustible material.

(d) If the precautions in (b) or (c) are not practical, then a second person shall be present to observe and extinguish fires.

(e) Inspection(s) of the affected area shall be made during the first hour after the operation is terminated. If the mine operator deems that working conditions and the degree of potential hazard warrant it, additional inspections shall be made or other extra-precautionary measures shall be taken.

57.4-79 through 57.4-84 [Reserved]

57.4-85 *Mandatory.* Stationary diesel equipment shall not be supported on a combustible base.

57.4-86 *Mandatory.* Stationary diesel equipment shall be provided with a thermal sensor which automatically stops the diesel engine should overheating occur.

OMB CONTROL Nos. 1219-0013, paragraph 57.4-23; 1219-0062, paragraph 57.4-48; 1219-0023, paragraph 57.4-61A; 1219-0022, paragraph 57.4-69; 1219-0055, paragraph 57.4-73 and 1219-0058, paragraph 57.4-74 (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12517, July 31, 1969, as amended at 35 FR 3671, Feb. 25, 1970; 35 FR 18591, Dec. 8, 1970; 37 FR 14373, July 19, 1972; 38 FR 23382, Aug. 29, 1973; 38 FR 23781, Sept. 4, 1973; 39 FR 9653, Mar. 13, 1974; 41 FR 23616, June 10, 1976; 44 FR 31917, June 1, 1979; 44 FR 48527, Aug. 17, 1979; 44 FR 68828, Nov. 30, 1979; 45 FR 47005, July 11, 1980; 46 FR 33517, June 30, 1981; 47 FR 14706, Apr. 6, 1982]

§ 57.5 Air quality, ventilation, radiation, and physical agents.

AIR QUALITY

GENERAL—SURFACE AND UNDERGROUND

57.5-1 *Mandatory.* Except as permitted by § 57.5-5: (a) Except as provided in paragraph (b), the exposure to airborne contaminants shall not exceed, on the basis of a time weighted average, the threshold limit values adopted by the American Conference of Governmental Industrial Hygienists, as set forth and explained in the 1973 edition of the Conference's publication, entitled "TLV's Threshold Limit Values for Chemical Substances in Workroom Air Adopted by ACGIH for 1973," pages 1 through 54, which are hereby incorporated by reference and made a part hereof. This publication may be obtained from the American Conference of Governmental Industrial Hygienists by writing to the Secretary-Treasurer, P.O. Box 1937, Cincinnati, Ohio 45201, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration. Excursions above the listed thresholds shall not be of a greater magnitude than is characterized as permissible by the Conference.

(b) The 8-hour time-weighted average airborne concentration of asbestos dust to which employees are exposed shall not exceed 2 fibers per milliliter greater than 5 microns in length, as determined by the membrane filter method at 400-450 magnification (4 millimeter objective) phase contrast illumination. No employees shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers longer than 5 micrometers, per milliliter of air, as determined by the membrane filter method over a minimum sampling time of 15 minutes. "Asbestos" is a generic term for a number of hydrated silicates that, when crushed or processed, separate into flexible fibers made up of fibrils. Although there are many asbestos minerals, the term "asbestos" as used herein is limited to the following minerals: chrysotile, amosite, crocidolite, anthophylite asbestos, tremolite asbestos, and actinolite asbestos.

(c) Employees shall be withdrawn from areas where there is present an airborne contaminant given a "C" designation by the Conference and the concentration exceeds the threshold limit value listed for that contaminant.

57.5-2 *Mandatory.* Dust, gas, mist, and fume surveys shall be conducted as frequently as necessary to determine the adequacy of control measures.

57.5-3 *Mandatory.* Holes shall be collared and drilled wet, or other efficient dust control measures shall be used when drilling non-water-soluble material. Efficient dust-control measures shall be used when drilling water-soluble materials.

57.5-4 [Reserved]

57.5-5 *Mandatory.* Control of employee exposure to harmful airborne contaminants shall be, insofar as feasible, by prevention of contamination, removal by exhaust ventilation, or by dilution with uncontaminated air. However, where accepted engineering control measures have not been developed or when necessary by the nature of work involved (for example, while establishing controls or occasional entry into hazardous atmospheres to perform maintenance or investigation), employees may work for reasonable periods of time in concentrations of airborne contaminants exceeding permissible levels if they are protected by appropriate respiratory protective equipment. Whenever respiratory protective equipment is used a program for selection, maintenance, training, fitting, supervision, cleaning, and use shall meet the following minimum requirements:

(a) Mine Safety and Health Administration approved respirators which are applicable and suitable for the purpose intended shall be furnished, and employees shall use the protective equipment in accordance with training and instruction.

(b) A respirator program consistent with the requirements of ANSI Z88.2-1969, published by the American National Standards Institute and entitled "American National Standards Practices for Respiratory Protection ANSI Z88.2-1969," approved August 11, 1969, which is hereby incorporated by reference and made a part hereof. This publication may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration.

(c) When respiratory protection is used in atmospheres immediately harmful to life, the presence of at least one other person with backup equipment and rescue capability shall be required in the event of failure of the respiratory equipment.

57.5-6 *Mandatory.* The following chemical substances shall not be used or stored except by competent persons under laboratory conditions approved by a nationally recognized agency acceptable to the Secretary.

(a) Carbon tetrachloride,
(b) Phenol,
(c) 4-Nitrobiphenyl,
(d) Alpha-naphthylamine,
(e) 4,4-Methylene Bis (2-chloroaniline),
(f) Methyl-chloromethyl ether,
(g) 3,3 Dichlorobenzidine,
(h) Bis (chloromethyl) ether,
(i) Beta-napthylamine,
(j) Benzidine,
(k) 4-Aminodiphenyl,
(l) Ethyleneimine,
(m) Beta-propiolactone,
(n) 2-Acetylaminofluorene,
(o) 4-Dimethylaminobenzene, and
(p) N-Nitrosodimethylamine.

57.5-7 through 57.5-9 [Reserved]

SURFACE ONLY

57.5-10 *Mandatory.* Silica sand, or other materials containing more than 1 percent free silica, shall not be used as an abrasive substance in abrasive blasting cleaning operations without requiring full-flow respiratory protection, or equivalent, to all exposed persons.

57.5-11 through 57.5-14 [Reserved]

UNDERGROUND ONLY

57.5-15 *Mandatory.* Air in all active workings shall contain at least 19.5 volume percent oxygen

57.5-16 *Mandatory.* Silica sand, or other materials containing more than 1 percent free silica, shall not be used as an abrasive substance in abrasive blasting cleaning operations.

57.5-17 [Reserved]

VENTILATION

GENERAL—SURFACE AND UNDERGROUND

57.5-18A [Reserved]

57.5-18B *Mandatory.* Areas within twenty-five (25) feet of main and booster fans shall be kept free of combustible materials except for installed wiring, materials used for fan maintenance, direct fired heaters, and materials used for ground support.

57.5-18C [Reserved]

57.5-18D *Mandatory.* (a) All mine main and booster fans installed and used to ventilate the active workings of the mine shall be operated continuously while persons are underground in the active workings. However, this provision is not applicable during scheduled production-cycle shutdowns or planned or scheduled fan maintenance or fan adjustments where air quality is maintained in compliance with the applicable standards of section 57.5 and all persons underground in the affected areas are advised in advance of such scheduled or planned fan shutdowns, maintenance, or adjustments.

(b) In the event of main or booster fan failure due to a malfunction, accident, power failure, or other such unplanned or unscheduled event:

(1) The air quality in the affected active workings shall be tested at least within 2-hours of the discovery of the fan failure, and at least every 4-hours thereafter by a competent person for compliance with the requirements of the applicable standards of section 57.5 until normal ventilation is restored, or

(2) All persons, except those working on the fan, shall be withdrawn, the ventilation shall be restored to normal and the air quality in the affected active workings shall be tested by a competent person to assure that the air quality meets the requirements of the standards in section 57.5, before any other persons are permitted to enter the affected active workings.

57.5-18E [Reserved]

57.5-18F *Mandatory.* All underground main fans shall have controls placed at a suitable protected location remote from the fan and preferably on the surface.

57.5-18G through 57.5-18Z [Reserved]

SURFACE ONLY

57.5-19A through 57.5-19Z [Reserved]

UNDERGROUND ONLY

57.5-20 *Mandatory.* A plan of the mine ventilation system shall be set out by the operator in written form. Revisions of the system shall be noted and updated at least annually. The ventilation plan or revisions thereto shall be submitted to the District Manager for review and comments upon his written request. The plan shall, where applicable, contain the following:

(a) The mine name.

(b) The current mine map or schematic or series of mine maps or schematics of an appropriate scale, not greater than five hundred (500) feet to the inch, showing:

(1) Direction and quantity of principal air flows;

(2) Locations of seals used to isolate abandoned workings;

(3) Locations of areas withdrawn from the ventilation system;

(4) Locations of all main, booster and auxiliary fans not shown in subsection (d) of this standard;

(5) Locations of air regulators and stoppings and ventilation doors not shown in subsection (d) of this standard;

(6) Locations of overcasts, undercasts and other airway crossover devices not shown in subsection (d) of this standard;

(7) Locations of known oil or gas wells;

(8) Locations of known underground mine openings adjacent to the mine;

(9) Locations of permanent underground shops, diesel fuel storage depots, oil fuel storage depots, hoist rooms, compressors, battery charging stations and explosive storage facilities. Permanent facilities are those intended to exist for one year or more; and

(10) Significant changes in the ventilation system projected for one year.

(c) Mine fan data for all active main and booster fans including manufacturer's name, type, size, fan speed, blade setting, approximate pressure at present operating point, and motor brake horsepower rating.

(d) Diagrams, descriptions or sketches showing how ventilation is accomplished in each typical type of working place including the approximate quantity of air provided, and typical size and type of auxiliary fans used.

(e) The number and type of internal combustion engine units used underground, including make and model of unit, type of engine, make and model of engine, brake horsepower rating of engine, and approval number.

57.5-21 [Reserved]

57.5-22 *Mandatory.* Fan housings and air ducts connecting main fans to underground openings shall be fire-resistant.

57.5-23 and 57.5-24 [Reserved]

57.5-25 *Mandatory.* Main fans shall be maintained according to either the manufacturer's recommendations or a written periodic schedule adopted by the operator which shall be available at the operation on request of the Secretary or his authorized representative.

57.5-26 [Reserved]

57.5-27 *Mandatory.* Flame safety lamps or other suitable devices shall be used to test for acute oxygen deficiency.

57.5-28 *Mandatory.* Unventilated areas shall be sealed, or barricaded and posted against entry.

57.5-29 *Mandatory.* When auxiliary fan systems are used, such systems shall minimize recirculation and be maintained to provide ventilation air that effectively sweeps the working places.

57.5-30 [Reserved]

57.5-31 *Mandatory.* Ventilation doors shall be:

(a) Substantially constructed.

(b) Covered with fire-retardant material, if constructed of wood.

(c) Maintained in good condition.

(d) Self-closing, if manually operated.

(e) Equipped with audible or visual warning devices, if mechanically operated.

57.5-32 *Mandatory.* When ventilation control doors are opened as a part of the normal mining cycle, they shall be closed as soon as possible to re-establish normal ventilation to working places.

57.5-33 [Reserved]

57.5-34 *Mandatory.* (a) Auxiliary fans installed and used to ventilate the active workings of the mine shall be operated continuously while persons are underground in the active workings, *except* for scheduled production-cycle shutdowns or planned or scheduled fan maintenance or fan adjustments where air quality is maintained in compliance with the applicable standards of Section 57.5, and all persons underground in the affected areas are advised in advance of such scheduled or planned fan shutdowns, maintenance, or adjustments.

(b) In the event of auxiliary fan failure due to malfunction, accident, power failure, or other such unplanned or unscheduled event:

(1) The air quality in the affected active workings shall be tested at least within 2-hours of the discovery of the fan failure, and at least every 4-hours thereafter by a competent person for compliance with the requirements of the applicable standards of section 57.5 until normal ventilation is restored, or

(2) All persons, except those working on the fan, shall be withdrawn, the ventilation

shall be restored to normal and the air quality in the affected active workings shall be tested by a competent person to assure that the air quality meets the requirements of the standards in section 57.5, before any other persons are permitted to enter the affected active workings.

57.5-35A *Mandatory.* Seals shall be provided with a means for checking the quality of air behind the seal and a means to prevent a water head from developing unless the seal is designed to impound water.

57.5-35B through 57.5-35Z [Reserved]

57.5-36 [Reserved]

RADIATION

UNDERGROUND ONLY

57.5-37 *Mandatory.* (a) In all mines at least one sample shall be taken in exhaust mine air by a competent person to determine if concentrations of radon daughters are present. Sampling shall be done using suggested equipment and procedures described in section 14.3 of ANSI N13.8-1973, entitled "American National Standard Radiation Protection in Uranium Mines," approved July 18, 1973, pages 13-15, by the American National Standards Institute, Inc., which is incorporated by reference and made a part of the standard or equivalent procedures and equipment acceptable to the Administrator, Metal and Nonmetal Mine Safety and Health, Mine Safety and Health Administration. This publication may be examined at any Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration, or may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018. The mine operator may request that the required exhaust mine air sampling be done by the Mine Safety and Health Administration. If concentrations of radon daughters in excess of 0.1 WL are found in an exhaust air sample, thereafter—

(1) Where uranium is mined—radon daughter concentrations representative of worker's breathing zone shall be determined at least every two weeks at random times in all active working areas such as stopes, drift headings, travelways, haulageways, shops, stations, lunch rooms, magazines, and any other place or location where persons work, travel, or congregate. However, if concentrations of radon daughters are found in excess of 0.3 WL in an active working area, radon daughter concentrations thereafter shall be determined weekly in that working area until such time as the weekly determinations in that area have been 0.3 WL or less for 5 consecutive weeks.

(2) Where uranium is not mined—when radon daughter concentrations between 0.1 and 0.3 WL are found in an active working area, radon daughter concentration measurements representative of worker's breathing zone shall be determined at least every 3 months at random times until such time as the radon daughter concentrations in that area are below 0.1 WL, and annually thereafter. If concentrations of radon daughters are found in excess of 0.3 WL in an active working area radon daughter concentrations thereafter shall be determined at least weekly in that working area until such time as the weekly determinations in that area have been 0.3 WL or less for 5 consecutive weeks.

(b) If concentrations of radon daughters less than 0.1 WL are found in an exhaust mine air sample, thereafter:

(1) Where uranium is mined—at least one sample shall be taken in the exhaust mine air monthly.

(2) Where uranium is not mined—no further exhaust mine air sampling is required.

(c) The sample date, locations, and results obtained under (a) and (b) above shall be recorded and retained at the mine site or nearest mine office for at least two (2) years and shall be made available for inspection by the Secretary or his authorized representative.

57.5-38 *Mandatory.* No person shall be permitted to receive an exposure in excess of 4 WLM in any calendar year.

57.5-39 *Mandatory.* Except as provided by standard 57.5-5, persons shall not be exposed to air containing concentrations of radon daughters exceeding 1.0 WL in active workings.

57.5-40 *Mandatory.* (a) The operator shall calculate and record complete individual exposures to concentrations of radon daughters as follows:

(1) Where uranium is mined—the complete individual exposures of all mine personnel working underground shall be calculated and recorded. These records shall include the individual's time in each active working area such as stopes, drift headings, travelways, haulageways, shops, stations, lunch rooms, magazines and any other place or location where persons work, travel or congregate, and the concentration of airborne radon daughters for each active working area.

(2) Where uranium is not mined—the complete individual exposure of all mine personnel working in active working areas with radon daughter concentrations in excess of 0.3 WL shall be calculated and recorded. These records shall include the individual's time in each active working area and the concentrations of airborne radon daughters for each active working area. The operator may discontinue calculating and recording the individual exposures of any personnel assigned to work in active working areas where radon daughter concentrations have been reduced to 0.3 WL or less for 5 con-

secutive weeks provided that such exposure calculation and recordation shall not be discontinued with respect to any person who has accumulated more exposure than $\frac{1}{12}$ (one-twelfth) of a WLM times the number of months for which exposures have been calculated and recorded in the calendar year in which the exposure calculation and recordation is proposed to be discontinued.

(b) The operator shall maintain the form entitled "Record of Individual Exposure to Radon Daughters" (Form 4000-9), or equivalent forms that are acceptable to the Administrator, Metal and Nonmetal Mine Safety and Health, Mine Safety and Health Administration, on which there shall be recorded the specific information required by the form with respect to each person's time-weighted current and cumulative exposure to concentrations of radon daughters.

(1) The form entitled "Record of Individual Exposure to Radon Daughters" (Form 4000-9), shall consist of an original of each form for the operator's records which shall be available for examination by the Secretary or his authorized representative.

(2) On or before February 15 of each calendar year, or within 45 days after the shutdown of mining operations for the calendar year, each mine operator shall submit to the Mine Safety and Health Administration a copy of the "Record of Individual Exposure to Radon Daughters" (Form 4000-9), or acceptable equivalent form, showing the data required by the form for all personnel for whom calculation and recording of exposure was required during the previous calendar year.

(3) Errors detected by the operator shall be corrected on any forms kept by the operator and a corrected copy of any forms submitted to the Mine Safety and Health Administration shall be submitted to the Mine Safety and Health Administration within 60 days of detection and shall identify the errors and indicate the date the corrections are made.

(4) The operator's records of individual exposure to concentrations of radon daughters and copies of "Record of Individual Exposure to Radon Daughters" (Form 4000-9) or acceptable equivalent form or true legible facsimiles thereof (microfilm or other), shall be retained at the mine or nearest mine office for a period as specified in paragraph 9.8, ANSI N13.8-1973, or shall be submitted to the Mine Safety and Health Administration. These records, if retained by the operator, shall be open for inspection by the Secretary of Labor, his authorized representative, and authorized representatives of the official mine inspection agency of the State in which the mine is located. Paragraph 9.8, ANSI N13.8-1973, is incorporated by reference and made a part of this standard. ANSI N13.8-1973, may be examined at any Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration, and may be obtained from the American National Standards Institute, Inc., at 1430 Broadway, New York, New York 10018.

(5) Upon written request from a person who is a subject of these records, a statement of the year-to-date and cumulative exposure applicable to that person shall be provided to the person or to whomever such person designates.

(6) The blank form entitled "Record of Individual Exposure to Radon Daughters" (Form 4000-9) may be obtained on request from any Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration.

NOTE: To calculate an individual's exposure to WLM for a given period of time, multiply the total exposure time (hours to the nearest half-hour) in an active working area by the average concentration of airborne radon daughters for the applicable active working area (average working level calculated to the nearest hundredth working level) and divide the product by the constant 173 hours per month.

An average airborne radon daughter concentration for a designated active working area shall be determined by averaging all sampling results for that working area during the time that persons are present. Any sample taken by Federal or State mine inspectors, which represents exposure to miners and reported to the operator within three (3) days of being taken, shall be included in the average concentration; except that if the mine operator samples simultaneously with the inspector, he may use his own sample results.

57.5-41 *Mandatory.* Smoking shall be prohibited in all areas of a mine where exposure records are required to be kept in compliance with standard 57.5-40.

57.5-42 *Mandatory.* If levels of permissible exposures to concentrations of radon daughters different from those prescribed in 57.5-38 are recommended by the Environmental Protection Agency and approved by the President, no employee shall be permitted to receive exposures in excess of those levels after the effective dates established by the Agency.

57.5-43 [Reserved]

57.5-44 *Mandatory.* The wearing of respirators approved for protection against radon daughters shall be required in environments exceeding 1.0 WL and respirator use shall be in compliance with standard 57.5-5.

57.5-45 *Mandatory.* Inactive working, in which radon daughter concentrations are above 1.0 WL, shall be posted against unauthorized entry and designated by signs indicating them as areas in which approved respirators shall be worn.

57.5-46 *Mandatory.* Where radon daughter concentrations exceed 10 WL, respirator protection against radon gas shall be provided in addition to protection against radon daughters. Protection against radon gas shall be provided by supplied air devices or by face masks containing absorbent material capable of removing both the radon and its daughters.

57.5-47 *Mandatory.* Gamma radiation surveys shall be conducted annually in all underground mines where radioactive ores are mined: (a) Surveys shall be in accordance with American National Standards (ANSI) Standard N13.8-1973, entitled "Radiation Protection in Uranium Mines", section 14.1 page 12, which is hereby incorporated by reference and made a part hereof. This publication may be examined in any Metal and Nonmetal Mine Safety and Health Subdistrict Office, Mine Safety and Health Administration, or may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018. (b) Where average gamma radiation measurements are in excess of 2.0 milliroentgens per hour in the working place, gamma radiation dosimeters shall be provided for all persons affected, and records of cumulative individual gamma radiation exposure shall be kept. (c) Annual individual gamma radiation exposure shall not exceed 5 Rems.

57.5-48 and 57.5-49 [Reserved]

PHYSICAL AGENTS

GENERAL—SURFACE AND UNDERGROUND

57.5-50 *Mandatory.* (a) No employee shall be permitted an exposure to noise in excess of that specified in the table below. Noise level measurements shall be made using a sound level meter meeting specifications for type 2 meters contained in American National Standards Institute (ANSI) Standard S1.4-1971, "General Purpose Sound Level Meters," approved April 27, 1971, which is hereby incorporated by reference and made a part hereof, or by a dosimeter with similar accuracy. This publication may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018, or may be examined in any Metal and Nonmetal Mine Health and Safety District or Subdistrict Office of the Mine Safety and Health Administration.

PERMISSIBLE NOISE EXPOSURES

Duration per day, hours of exposure	Sound level dBA, slow response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

No exposure shall exceed 115 dBA. Impact or impulsive noises shall not exceed 140 dB, peak sound pressure level.

NOTE: When the daily exposure is composed of two or more periods of noise exposure at different levels, their combined effect shall be considered rather than the individual effect of each.

If the sum

$$(C_1/T_1)+(C_2/T_2)+\dots(C_n/T_n)$$

exceeds unity, then the mixed exposure shall be considered to exceed the permissible exposure C_n indicates the total time of exposure at a specified noise level, and T_n indicates the total time of exposure permitted at that level. Interpolation between tabulated values may be determined by the following formula:

$$\log T=6.322-0.0602\,SL$$

Where T is the time in hours and SL is the sound level in dBA.

(b) When employees' exposure exceeds that listed in the above table, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce exposure to within permissible levels, personal protection equipment shall be provided and used to reduce sound levels to within the levels of the table.

OMB CONTROL Nos. 1219-0048, paragraph 57.5-5; 1219-0016, paragraph 57.5-20; 1219-0012, paragraph 57.5-25; 1219-0061, paragraph 57.5-37 and 1219-0039, paragraph 57.5-47. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12517, July 31, 1969, as amended at 35 FR 3672, Feb. 25, 1970; 35 FR 4515, Mar. 13, 1970; 35 FR 18591, Dec. 8, 1970; 39 FR 24319, 24320, July 1, 1974; 39 FR 28434, Aug. 7, 1974; 39 FR 35999, Oct. 7, 1974; 41 FR 23616, June 10, 1976; 41 FR 28266, June 2, 1976; 42 FR 29422, June 8, 1977; 42 FR 57043, Oct. 31, 1977; 43 FR 43458, Sept. 26, 1978; 43 FR 54067, Nov. 17, 1978; 44 FR 31917, June 1, 1979; 44 FR 36385, June 22, 1979; 44 FR 48528, Aug. 17, 1979; 44 FR

50571, Aug. 28, 1979; 44 FR 68828, 68829, Nov. 30, 1979; 47 FR 14706, Apr. 6, 1982]

§ 57.6 Explosives.

The term "explosives" as used in this § 57.6 includes blasting agents. The standards in this section in which the term "explosives" appears are applicable to blasting agents (as well as to other explosives) unless blasting agents are expressly excluded.

STORAGE

GENERAL—SURFACE AND UNDERGROUND

57.6-1 *Mandatory.* Detonators and explosives other than blasting agents shall be stored in magazines.

57.6-2 *Mandatory.* Detonators shall not be stored in the same magazine with explosives.

57.6-3 and 57.6-4 [Reserved]

57.6-5 *Mandatory.* Areas surrounding magazines and facilities for the storage of blasting agents shall be kept clear of rubbish, brush, dry grass, or trees (other than live trees 10 or more feet tall), for a distance not less than 25 feet in all directions, and other unnecessary combustible materials for a distance of not less than 50 feet.

57.6-6 [Reserved]

57.6-7 *Mandatory.* Explosives, detonators, and related materials such as safety fuse and detonating cord shall be:

(a) Stored in a manner to facilitate use of oldest stocks first.

(b) Stored according to brand and grade in such a manner as to facilitate identification.

(c) Stored with their top sides up.

(d) Stacked in a stable manner but not more than eight (8) feet high.

57.6-8 *Mandatory.* Ammonium nitrate-fuel oil blasting agents shall be physically separated from other explosives, safety fuse, or detonating cord stored in the same magazine and in such a manner that oil does not contaminate the other explosives, safety fuse, or detonating cord.

57.6-9 and 57.6-10 [Reserved]

57.6-11 *Mandatory.* Containers of explosives, blasting agents, and detonators shall be closed while being stored.

57.6-12 *Mandatory.* Prior to interior repair of facilities for storage of explosives, including blasting agents, all materials stored within the facility shall be removed and the interior cleaned. Prior to the exterior repair of such facilities, all materials stored within the facility shall be removed, if there exists a possibility that such repairs may produce a spark or flame. The explosives removed from storage facilities to be repaired shall be placed either in other storage facilities appropriate for the storage of such materials under this section or a safe distance from the facilities under repair where they shall be properly guarded and protected until the repairs have been completed and the materials have been returned to storage within the facilities.

57.6-13 through 57.6-19 [Reserved]

SURFACE ONLY

57.6-20 *Mandatory.* Magazines shall be:

(a) Located in accordance with the current American Table of Distances for storage of explosives.

(b) Detached structures located away from powerlines, fuel storage areas, and other possible sources of fire.

(c) Constructed substantially of noncombustible material or covered with fire-resistant material.

(d) Reasonably bullet resistant.

(e) Electrically bonded and grounded if constructed of metal.

(f) Made of nonsparking material on the inside, including floors.

(g) Provided with adequate and effectively screened ventilation openings near the floor and ceiling.

(h) Kept locked securely when unattended.

(i) Posted with suitable danger signs so located that a bullet passing through the face of a sign will not strike the magazine.

(j) Used exclusively for storage of explosives or detonators and kept free of all extraneous materials.

(k) Kept clean and dry in the interior, and in good repair.

(l) Unheated, unless heated in a manner that does not create a fire or explosion hazard. Electrical heating devices shall not be used inside a magazine.

57.6-21 through 57.6-24 [Reserved]

UNDERGROUND ONLY

57.6-25 through 57.6-26 [Reserved]

57.6-27 *Mandatory.* Box-type underground-distribution storage magazines used to store explosives or detonators near working faces shall be constructed with only nonsparking material inside and equipped with covers or doors and shall be located out of the line of blasts.

57.6-28 [Reserved]

57.6-29 *Mandatory.* Secondary underground and box-type underground magazines shall be labeled suitably.

57.6-30 *Mandatory.* Detonator-storage magazines shall be of the same construction as explosives-storage magazines and shall be separated by at least 25 feet from explosives-storage magazines.

57.6-31 through 57.6-39 [Reserved]

TRANSPORTATION

GENERAL—SURFACE AND UNDERGROUND

57.6-40 *Mandatory.* Explosives and detonators shall be transported in separate vehicles unless separated by 4 inches of hardwood or the equivalent.

57.6-41 *Mandatory.* When explosives and detonators are hauled by trolley locomotive, covered, electrically-insulated cars shall be used.

57.6-42 *Mandatory.* Self-propelled vehicles used to transport explosives or detonators shall be equipped with suitable fire extinguishers.

57.6-43 *Mandatory.* Vehicles containing explosives or detonators shall be posted with proper warning signs.

57.6-44 *Mandatory.* When vehicles containing explosives or detonators are parked, the brakes shall be set, the motive power shut off, and the vehicles shall be blocked securely against rolling.

57.6-45 *Mandatory.* Vehicles containing explosives or detonators shall not be taken to a repair garage or shop for any purpose.

57.6-46 *Mandatory.* Vehicles containing explosives or detonators shall be maintained in good condition and shall be operated at a safe speed and in accordance with all safe operating practices.

57.6-47 *Mandatory.* Vehicles used to transport explosives, other than blasting agents, shall have substantially constructed bodies, no sparking metal exposed in the cargo space, and shall be equipped with suitable sides and tail gates; explosives shall not be piled higher than the side or end enclosures.

57.6-48 *Mandatory.* Explosives and blasting agents shall be transported without undue delay, and over routes and at times that expose a minimum number of persons.

57.6-49 [Reserved]

57.6-50 *Mandatory.* Other materials or supplies shall not be placed on or in the cargo space of a conveyance containing explosives, detonating cord or detonators, except for safety fuse and except for properly secured, nonsparking equipment used expressly in the handling of such explosives, detonating cord or detonators.

57.6-51 *Mandatory.* Explosives or detonators shall not be transported on locomotives.

57.6-52 [Reserved]

57.6-53 *Mandatory.* Only the necessary attendants shall ride on or in vehicles containing explosives or detonators.

57.6-54 *Mandatory.* Explosives or detonators shall not be transported on mantrips.

57.6-55 [Reserved]

57.6-56 *Mandatory.* Substantial nonconductive containers shall be used to carry explosives to blasting sites.

57.6-57 *Mandatory.* Nonconductive containers with tight-fitting covers shall be used to transport or carry capped fuses and electric detonators to blasting sites.

57.6-58 through 57.6-64 [Reserved]

SURFACE ONLY

57.6-65 *Mandatory.* Vehicles containing detonators or explosives, other than blasting agents, shall not be left unattended except in blasting areas where loading or charging is in progress.

57.6-66 through 57.6-74 [Reserved]

UNDERGROUND ONLY

57.6-75 *Mandatory.* Men assigned to and responsible for hoisting shall be notified whenever explosives or detonators are being transported in a shaft conveyance.

57.6-76 *Mandatory.* Hoisting in adjacent shaft compartments shall be stopped when explosives or detonators are being handled.

57.6-77 *Mandatory.* Vehicles shall be attended, whenever practical and possible, while loaded with explosives or detonators.

57.6-78 through 57.6-89 [Reserved]

USE

GENERAL—SURFACE AND UNDERGROUND

57.6-90 *Mandatory.* Persons who use or handle explosives or detonators shall be experienced men who understand the hazards involved; trainees shall do such work only under the supervision of and in the immediate presence of experienced men.

57.6-91 *Mandatory.* Blasting operations shall be under the direct control of authorized persons.

57.6-92 *Mandatory.* Damaged or deteriorated explosives and blasting agents shall be destroyed in a safe manner under the instructions of the explosives or blasting agent manufacturer or its designated agent.

57.6-93 *Mandatory.* Boreholes shall be cleared of obstructions before charging.

57.6-94 *Mandatory.* Holes to be blasted shall be charged as near to blasting time as practical and such holes shall be blasted as soon as possible after charging has been completed. In no case shall the time elapsing between the completion of charging to the time of blasting exceed 72 hours unless prior approval has been obtained from the Mine Safety and Health Administration.

57.6-95 [Reserved]

57.6-96 *Mandatory.* Explosives shall be kept separated from detonators until charging is started.

57.6-97 *Mandatory.* Primers shall be made up only at the time of use and as close to the blasting area as conditions allow.

57.6-98 *Mandatory.*

(a) Primers containing a detonator shall be prepared with the detonator contained securely and completely within the explosive charge or within a suitable tunnel or cap well.

(b) When using detonating cord to initiate another explosive, a connection shall be prepared with the detonating cord threaded through, attached securely to, or otherwise in intimate contact with the explosive charge.

57.6-99 *Mandatory.* Only wooden or other nonsparking implements shall be used to punch holes in an explosive cartridge.

57.6-100 *Mandatory.* Tamping poles shall be of wood or other material acceptable to the Mine Safety and Health Administration. Couplers of tamping poles shall be of nonsparking materials.

57.6-101 *Mandatory.* Tamping shall not be done directly on a primer.

57.6-102 *Mandatory.* Unused explosives and detonators shall be moved to a safe location as soon as charging operations are completed.

57.6-103 *Mandatory.* Areas in which charged holes are awaiting firing shall be guarded, or barricaded and posted, or flagged against unauthorized entry.

57.6-104 *Mandatory.* When safety fuse has been used, men shall not return to misfired holes for at least 30 minutes.

57.6-105 *Mandatory.* When electric blasting caps have been used, men shall not return to misfired holes for at least 15 minutes.

57.6-106 *Mandatory.* Faces and muck piles shall be examined by a competent person for undetonated explosives or blasting agents and any undetonated explosives or blasting agents found shall be disposed of safely.

57.6-107 *Mandatory.* Holes shall not be drilled where there is danger of intersecting a charged or misfired hole.

57.6-108 *Mandatory.* Fuse and igniters shall be stored in a cool, dry place away from oils or grease.

57.6-109 *Mandatory.* Safety fuse, igniter cord, and detonating cord shall not be used if they have been kinked, bent sharply, or otherwise damaged.

57.6-110 *Mandatory.* Fuses shall be cut and capped in safe, dry locations posted with "No Smoking" signs.

57.6-111 *Mandatory.* Blasting caps shall be crimped to fuses only with implements designed for that specific purpose.

57.6-112 *Mandatory.* The burning rate of the safety fuse in use at any time shall be measured, posted in conspicuous locations, and brought to the attention of all men concerned with blasting.

57.6-113 *Mandatory.* When firing from 1 to 15 blastholes with safety fuse ignited individually using hand-held lighters, the fuses shall be of such lengths to provide the minimum burning time specified in the following table for a particular size round:

No. of holes in a round	Minimum burning time, minutes
1	2
2 to 5	2⅔
6 to 10	3⅓
11 to 15	5

In no case shall any 40-second-per-foot safety fuse less than 36 inches long or any 30-second-per-foot safety fuse less than 48 inches long be used.

57.6-114 *Mandatory.* At least two men shall be present when lighting fuses, and no man shall light more than 15 individual fuses. If more than 15 holes per man are to be fired, igniter cord and connectors or electric blasting shall be used.

57.6-115 *Mandatory.* All detonating cord knots shall be tight and all connections shall be kept at right angles to the trunklines.

57.6-116 *Mandatory.* Fuse shall be ignited with hotwire lighters, lead spitters, igniter cord, or other such devices designed for this purpose. Carbide lights shall not be used to light fuses.

57.6-117 *Mandatory.* Fuse shall not be ignited before the primer and the entire charge are securely in place.

57.6-118 *Mandatory.* When using safety fuse, where fly rock might damage unlit or burning fuses, timing shall be such that all fuses are burning within the holes before any hole detonates.

57.6-119 *Mandatory.* Electric detonators of different brands shall not be used in the same round.

57.6-120 *Mandatory.* Except when being tested with a blasting galvanometer:

(a) Electric detonators shall be kept shunted until they are being connected to the blasting line or wired into a blasting round.

(b) Wired rounds shall be kept shunted until they are being connected to the blasting line.

(c) Blasting lines shall be kept shunted until immediately before blasting.

57.6-121 *Mandatory.* When blasting electrically a blasting galvanometer, or other instrument that is specifically designed for testing blasting circuits, shall be used to test:

(a) In surface operations:

(1) Continuity of each electric blasting cap in the borehole prior to the addition of stemming.

(2) Resistance of individual series or the resistance of multiple balanced series to be connected in parallel prior to their connection to the blasting line.

(3) Continuity of blasting lines prior to the connection of electric blasting cap series.

(4) Total blasting circuit resistance prior to connection to the power source.

(b) In underground operations:

(1) Continuity of each electric blasting cap series.

(2) Continuity of blasting lines prior to the connection of electric blasting caps.

57.6-122 *Mandatory.* Permanent blasting lines shall be properly supported, insulated, and kept in good repair.

57.6-123 *Mandatory.* When electric detonators are used, charging shall be stopped immediately when the presence of static electricity or stray currents is detected; the condition shall be remedied before charging is resumed.

57.6-124 *Mandatory.* When electric detonators are used, charging shall be suspended in surface mining, shaft sinking, and tunneling and men withdrawn to a safe location upon the approach of an electrical storm.

57.6-125 *Mandatory.* If branch circuits are used when blasts are fired from power circuits, safety switches located at safe distances from the blast areas shall be provided in addition to the main blasting switch.

57.6-126 *Mandatory.* Electric power distribution circuits shall be de-energized within 50 feet of boreholes containing electric blasting caps which can be initiated by conventional power sources or extraneous electricity except that such circuits need not be de-energized between 25 and 50 feet of such boreholes when stray current tests, conducted as frequently as necessary, measure a maximum stray current less than 0.05 amperes through a one-ohm resistor measured at the location of the electric blasting cap.

57.6-127 *Mandatory.* Blasting switches shall be locked in the open position, except when closed to fire the blast. Lead wires shall not be connected to the blasting switch until the shot is ready to be fired.

57.6-128 *Mandatory.* The key or other control to an electrical firing device shall be entrusted only to the person designated to fire the round or rounds.

57.6-129 *Mandatory.* Electric circuits from the blasting switches to the blast area shall not be grounded.

57.6-130 *Mandatory.* At least a 15-foot air gap shall be provided between the blasting circuit and the electric power source.

57.6-131 *Mandatory.* Power sources shall be suitable for the number of electric detonators to be fired and for the type of circuits used.

57.6-132 *Mandatory.* Delay connectors shall be treated and handled with the same safety precautions as detonators.

57.6-133 *Mandatory.* If any part of a blast is connected in parallel and is to be initiated from powerlines or lighting circuits, the time of current flow shall be limited to a maximum of 25 milliseconds by incorporating a control device in the blasting circuit or by interrupting the circuit with an explosive charge attached to one or both lead lines and initiated by a zero-delay electric blasting cap.

57.6-134 *Mandatory.* Tools used for opening metal or nailed wooden containers of explosives or detonators shall be of nonsparking materials.

57.6-135 *Mandatory.* Holes shall not be collared in bootlegs.

57.6-136 *Mandatory.* Black powder shall not be used for blasting except when a desired result cannot be obtained with another type of explosive such as in quarrying certain types of dimension stone.

57.6-137 *Mandatory.* In the use of black blasting powder:

(a) Containers shall not be opened in, or within 50 feet of, any magazine; within any building in which a fuel-fired or exposed-element electric heater is in operation; where electrical or incandescent-particle sparks could result in powder ignition; or within 50 feet of any open flame.

(b) Granular powder shall be transferred from containers only by pouring.

(c) Spills of granular powder shall be cleaned up promptly with nonsparking equipment; contaminated powder shall be put into a container of water and its content disposed of promptly after the granules have disintegrated, or the spill area shall be flushed with a copious amount of water to completely disintegrate the granules.

(d) Containers of powder shall be kept securely closed at all times other than when the powder is being transferred from or into a container.

(e) Containers of powder transported by vehicles shall be in a wholly enclosed cargo space.

(f) Misfires shall be disposed of by: (1) Washing the stemming and powder charge from the borehole, and (2) removal and disposal of the initiator as a damaged explosive.

(g) Boreholes of shots that fire but fail to break, or fail to break properly, shall not be recharged for at least 12 hours.

57.6-138 *Mandatory.* Explosives or blasting agents shall not be loaded into drilled or sprung holes that could result in premature detonation from heat.

57.6-139 *Mandatory.* Blasting areas shall not be re-entered after firing until concentrations of smoke, dust, and fumes have been reduced to safe limits as required in, and determined by, mandatory standards 57.5-1 and 57.5-2, respectively.

57.6-140 *Mandatory.* Blasting circuits and electric blasting caps (which are capable of being initiated by conventional power sources) shall be protected from sources of extraneous electricity.

57.6-141 *Mandatory.* In secondary blasting, if more than one shot is to be fired at one time in a blasting area, the shots shall be initiated from one source.

57.6-142 *Mandatory.* Explosives or blasting agents shall not be loaded into boreholes through or with either drill stem equipment or other devices which could be extracted while containing explosives or blasting agents. The use of loading hose, collar sleeves or collar pipes is permitted.

57.6-143 through 57.6-158 [Reserved]

57.6-159 *Mandatory.* Powder chests shall be:

(a) Substantially constructed of nonsparking material on the inside.

(b) Posted with suitable warning signs.

(c) Located out of the blast area and out of the line of blasts.

(d) Emptied and their contents returned to the main magazine at the end of each shift unless the powder chest is located within the area continually attended by employees during shift changes.

(e) Separate for detonators and explosives unless separated by 4 inches of hard wood or the equivalent.

(f) Kept locked when unattended.

SURFACE ONLY

57.6-160 *Mandatory.* Ample warning shall be given before blasts are fired. All persons shall be cleared and removed from the blasting area unless suitable blasting shelters are provided to protect men endangered by concussion or flyrock from blasting.

57.6-161 *Mandatory.* If explosives are suspected of burning in a hole, all persons in the endangered area shall move to a safe location and no one shall return to the hole until the danger has passed, but in no case within 1 hour.

57.6-162 *Mandatory.* Lead wires and blasting lines shall not be strung across power conductors, pipelines, railroad tracks, or within 20 feet of bare powerlines. They shall be protected from sources of static or other electrical contact.

57.6-163 *Mandatory.* The double-trunkline or loop system shall be used in detonating-cord blasting.

57.6-164 *Mandatory.* Trunklines, in multiple-row blasts, shall make one or more complete loops, with crossties between loops at intervals of not over 200 feet.

57.6-165 through 57.6-167 [Reserved]

57.6-168 *Mandatory.* Misfires shall be reported to the proper supervisor and shall be disposed of safely before any other work is performed in that blasting area.

57.6-169 through 57.6-174 [Reserved]

UNDERGROUND ONLY

57.6-175 *Mandatory.* Ample warning shall be given before the blasts are fired. All persons shall be cleared and removed from areas endangered by the blast. Clear access to exits shall be provided for personnel firing the rounds.

57.6-176 [Reserved]

57.6-177 *Mandatory.* Misfires shall be reported to the proper supervisor. The blast area shall be dangered-off until misfired holes are disposed of. Where explosives other than black powder have been used, misfired holes shall be disposed of as soon as possible by one of the following methods:

(a) Washing the stemming and charge from the borehole with water;

(b) Reattempting to fire the holes if leg wires are exposed; or

(c) Inserting new primers after the stemming has been washed out.

57.6-178 through 57.6-181 [Reserved]

57.6-182 *Mandatory.* Blasts in shafts or winzes shall be initiated from a safe location outside the shaft or winze.

57.6-183 through 57.6-189 [Reserved]

SENSITIZED AMMONIUM NITRATE BLASTING AGENTS

All of the standards in this § 57.6 in which the term "explosives" appears are applicable to blasting agents (as well as to other explosives) unless blasting agents are expressly excluded.

GENERAL—SURFACE AND UNDERGROUND

57.6-190 through 57.6-192 [Reserved]

57.6-193 *Mandatory.* Where pneumatic loading is employed, before any type of blasting operation using blasting agents is put into effect, an evaluation of the potential hazard of static electricity shall be made. Adequate steps, including the grounding and bonding of the conductive parts of pneumatic loading equipment, shall be taken to eliminate the hazard of static electricity before blasting agent use is commenced.

57.6-194 *Mandatory.* Pneumatic loading equipment shall not be grounded to waterlines, air lines, rails, or the permanent electrical grounding systems.

57.6-195 *Mandatory.* Hoses used in connection with pneumatic loading machines shall be of the semiconductive type, having a total resistance low enough to permit the dissipation of static electricity and high enough to limit the flow of stray electric currents to a safe level. Wire-countered hose shall not be used because of the potential hazard from stray electric currents.

57.6-196 and 57.6-197 [Reserved]

57.6-198 *Mandatory.* Plastic tubes shall not be used as hole liners if blasting agents are loaded pneumatically into holes containing an electric detonator.

57.6-199 [Reserved]

57.6-200 *Mandatory.* Vehicles used to transport blasting agents shall have substantially constructed bodies, no zinc or copper exposed in the cargo space and shall be freely vented. Blasting agents shall not be piled higher than the side or end enclosures of open-body vehicles. If an enclosed screw conveyor is used to discharge blasting agents from the vehicle the conveyor shall be protected against excessive internal pressure and excessive frictional heat.

57.6-201 through 57.6-219 [Reserved]

UNDERGROUND ONLY

57.6-220 *Mandatory.* Ammonium nitrate-fuel oil blasting agents shall not be mixed or otherwise "formulated" underground.

57.6-221 through 57.6-249 [Reserved]

Miscellaneous General—Surface and Underground

57.6-250 *Mandatory.* Smoking and open flames, except for the use of suitable devices for igniting safety fuse or the use of approved heating devices, shall not be permitted within 50 feet as measured by the line of sight of explosives, blasting agents, or detonators or within 25 feet when out of line of sight and separated by permanent noncombustible barriers in underground active workings.

(Sec. 101, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811), and Sec. 301(b)(2), Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961(c)(3)))

[34 FR 12517, July 31, 1969; 34 FR 12947, Aug. 9, 1969; 35 FR 3672, Feb. 25, 1970; 35 FR 4515, Mar. 13, 1970; 35 FR 18591, Dec. 8, 1970; 37 FR 14373, July 19, 1972; 39 FR 24320, July 1, 1974; 41 FR 23617, June 10, 1976; 44 FR 48529, 48544, Aug. 17, 1979; 44 FR 53703, Sept. 14, 1979; 45 FR 68935, Oct. 17, 1980]

§ 57.7 Drilling.

Surface Only

57.7-1 [Reserved]

57.7-2 *Mandatory.* Equipment defects affecting safety shall be corrected before the equipment is used.

57.7-3 *Mandatory.* The drilling area shall be inspected for hazards before starting the drilling operations.

57.7-4 *Mandatory.* Men shall not be on a mast while the drill-bit is in operation unless they are provided with a safe platform from which to work and they are required to use safety belts to avoid falling.

57.7-5 *Mandatory.* Drill crews and others shall stay clear of augers or drill stems that are in motion. Persons shall not pass under or step over a moving stem or auger.

57.7-6 and 57.7-7 [Reserved]

57.7-8 *Mandatory.* When a drill is being moved from one drilling area to another, drill steel, tools, and other equipment shall be secured and the mast placed in a safe position.

57.7-9 *Mandatory.* If a drill helper assists the drill operator during movement of a drill to a new location, the helper shall be in sight of, or in communication with, the operator at all times.

57.7-10 *Mandatory.* In the event of power failure, drill controls shall be placed in the neutral position until power is restored.

57.7-11 *Mandatory.* The drill stem shall be resting on the bottom of the hole or on the platform with the stem secured to the mast before attempts are made to straighten a crossed cable on a reel.

57.7-12 *Mandatory.* While in operation, drills shall be attended at all times.

57.7-13 *Mandatory.* Drill holes large enough to constitute a hazard shall be covered or guarded.

57.7-14 through 57.7-17 [Reserved]

57.7-18 *Mandatory* Men shall not hold the drill steel while collaring holes, or rest their hands on the chuck or centralizer while drilling.

57.7-19 through 57.7-24 [Reserved]

Underground Only

57.7-25 through 57.7-27 [Reserved]

57.7-28 *Mandatory.* Persons shall not rest their hands on the chuck or centralizer while drilling.

57.7-29 through 57.7-31 [Reserved]

57.7-32 *Mandatory.* Columns and the drills mounted on them shall be anchored firmly before and during drilling.

57.7-33 through 57.7-49 [Reserved]

General—Surface and Underground

57.7-50 *Mandatory.* Receptacles or racks shall be provided for drill steel and tools stored or carried on drills.

57.7-51 *Mandatory.* To prevent injury to personnel, tools and other objects shall not be left loose on the mast or drill platform.

57.7-52 *Mandatory.* Persons shall not drill from—

(a) Positions which hinder their access to the control levers;

(b) Insecure footing or insecure staging; or

(c) Atop equipment not suitable for drilling.

57.7-53 *Mandatory.* Before hand-held drills are moved from one working area to another, air shall be turned off and bled from the hose.

57.7-54 *Mandatory.* Drill operators shall not start or move drilling equipment unless all miners are in the clear.

57.7-55 through 57.7-100 [Reserved]

[34 FR 12517, July 31, 1969, as amended at 35 FR 3674, Feb. 26, 1970; 35 FR 18592, Dec. 8, 1970; 44 FR 48529, Aug. 17, 1979]

§ 57.8 Rotary jet piercing.

SURFACE ONLY

57.8-1 *Mandatory.* Jet piercing drills shall be provided with—

(a) A system to pressurize the equipment operator's cab, when a cab is provided; and

(b) A protective cover over the oxygen flow indicator.

57.8-2 *Mandatory.* Safety chains or other suitable locking devices shall be provided across connections to and between high pressure oxygen hose lines of 1-inch inside diameter or larger.

57.8-3 *Mandatory.* A suitable means of protection shall be provided for the employee when lighting the burner.

57.8-4 *Mandatory.* When rotary jet piercing equipment requires refueling at locations other than fueling stations, a system for fueling without spillage shall be provided.

57.8-5 *Mandatory.* Men shall not smoke and open flames shall not be used in the vicinity of the oxygen storage and supply lines. Signs warning against smoking and open flames shall be posted in these areas.

57.8-6 *Mandatory.* The oxygen intake coupling on jet piercing drills shall be constructed so that only the oxygen hose can be coupled to it.

57.8-7 *Mandatory.* The combustion chamber of a jet drill stem which has been sitting unoperated in a drill hole shall be flushed with a suitable solvent after the stem is pulled up.

[34 FR 12517, July 31, 1969, as amended at 39 FR 24320, July 1, 1974; 44 FR 48529, Aug. 17, 1979]

§ 57.9 Loading, hauling, dumping.

GENERAL—SURFACE AND UNDERGROUND

57.9-1 *Mandatory.* Self-propelled equipment that is to be used during a shift shall be inspected by the equipment operator before being placed in operation. Equipment defects affecting safety shall be reported to, and recorded by the mine operator. The records shall be maintained at the mine or nearest mine office for at least 6 months from the date the defects are recorded. Such records shall be made available for inspection by the Secretary of Labor or his duly authorized representative.

57.9-2 *Mandatory.* Equipment defects affecting safety shall be corrected before the equipment is used.

57.9-3 *Mandatory.* Powered mobile equipment shall be provided with adequate brakes.

57.9-4 [Reserved]

57.9-5 *Mandatory.* Operators shall be certain, by signal or other means, that all persons are clear before starting or moving equipment.

57.9-6 *Mandatory.* When the entire length of a conveyor is visible from the starting switch, the operator shall visually check to make certain that all persons are in the clear before starting the conveyor. When the entire length of the conveyor is not visible from the starting switch, a positive audible or visible warning system shall be installed and operated to warn persons that the conveyor will be started.

57.9-7 *Mandatory.* Unguarded conveyors with walkways shall be equipped with emergency stop devices or cords along their full length.

57.9-8 [Reserved]

57.9-9 *Mandatory.* Operators shall sound warning before starting trains and when trains approach crossings, other trains on adjacent tracks, persons, and any place where vision is obscured.

57.9-10 *Mandatory.* Equipment operators' cabs shall not be equipped, altered or otherwise modified in a manner which impairs operating visibility.

57.9-11 *Mandatory.* Cab windows shall be of safety glass or equivalent, in good condition and shall be kept clean.

57.9-12 *Mandatory.* Cabs of mobile equipment shall be kept free of extraneous materials.

57.9-13 *Mandatory.* Adequate backstops or brakes shall be installed on inclined-conveyor drive units to prevent conveyors from running in reverse if a hazard to personnel would be caused.

57.9-14 *Mandatory.* No person shall be permitted to ride a power-driven chain, belt, or bucket conveyor, unless the belt is specifically designed for the transportation of persons.

57.9-15 *Mandatory.* Unless the operator is otherwise protected, slushers in excess of 10 horsepower shall be provided with backlash guards. All slushers shall be equipped with rollers, and drum covers, and anchored securely before slushing operations are started.

57.9-16 *Mandatory.* Roadbeds, rails, joints, switches, frogs, and other trackage elements on railroads subject to the control of the operator shall be designed, installed and maintained in a safe manner consistent with the speed and type of haulage.

57.9-17 *Mandatory.* Equipment operating speeds shall be consistent with conditions of roadways, grades, clearance, visibility, traffic and the type of equipment used

57.9-18 [Reserved]

57.9-19 *Mandatory.* Track guardrails, lead rails, and frogs shall be protected or blocked so as to prevent a person's foot from becoming wedged.

57.9-20 *Mandatory.* Positive-acting stopblocks, derail devices, track skates, or other adequate means shall be installed wherever necessary to protect persons from runaway or moving railroad equipment.

57.9-21 [Reserved]

57.9-22 *Mandatory.* Berms or guards shall be provided on the outer bank of elevated roadways.

57.9-23 *Mandatory.* Trackless haulage equipment shall be operated under power control at all times.

57.9-24 *Mandatory.* Mobile equipment operators shall have full control of the equipment while it is in motion.

57.9-25 *Mandatory.* Dippers, buckets, loading booms, or heavy suspended loads shall not be swung over the cabs of haulage vehicles until the drivers are out of the cabs and in safe locations, unless the trucks are designed specifically to protect the drivers from falling material.

57.9-26 *Mandatory.* A quick-close type air valve shall be provided on each piece of pneumatic-powered loading, hauling, and dumping equipment. The valve shall be closed except when the equipment is being operated.

57.9-27 *Mandatory.* When an operator is present, men shall notify him before getting on or off equipment.

57.9-28 *Mandatory.* Switch throws shall be installed so as to provide adequate clearance for switchmen.

57.9-29 [Reserved]

57.9-30 *Mandatory.* Men shall not work or pass under the buckets or booms of loaders in operation.

57.9-31 *Mandatory.* When traveling between work areas, the equipment shall be secured in the travel position.

57.9-32 *Mandatory.* Dippers, buckets, scraper blades, and similar movable parts shall be secured or lowered to the ground when not in use.

57.9-33 [Reserved]

57.9-34 *Mandatory.* Haulage equipment shall be loaded in a manner to minimize spillage during haulage.

57.9-35 *Mandatory.* Movements of two or more pieces of rail equipment operating independently on the same track shall be suitably controlled for safe operation.

57.9-36 *Mandatory.* Electrically-powered mobile equipment shall not be left unattended unless the master switch is in the off position, all operating controls are in the neutral position, and the brakes are set or other equivalent precautions are taken against rolling.

57.9-37 *Mandatory.* Mobile equipment shall not be left unattended unless the brakes are set. Mobile equipment with wheels or tracks, when parked on a grade, shall be either blocked or turned into a bank or rib; and the bucket or blade lowered to the ground to prevent movement.

57.9-38 [Reserved]

57.9-39 *Mandatory.* Men shall not get on or off moving equipment, except that trainmen may get on or off of slowly moving trains.

57.9-40 *Mandatory.* Men shall not be transported:

(a) In or on dippers, forks, clamshells, beds of trucks unless special provisions are made for their safety, or buckets except shaft buckets.

(b) On top of loaded haulage equipment.

(c) Outside the cabs and beds of mobile equipment, except trains.

(d) Between cars of trains.

(e) In conveyances equipped with unloading devices unless means are provided to prevent accidental starting of the unloading mechanism.

57.9-41 *Mandatory.* Only authorized persons shall be permitted to ride on trains or locomotives and they shall ride in a safe position.

57.9-42 *Mandatory.* Rocker-bottom or bottom-dump rail cars shall be equipped with locking devices.

57.9-43 and 57.9-44 [Reserved]

57.9-45 *Mandatory.* Equipment which is to be hauled shall be loaded and protected so as to prevent sliding or spillage.

57.9-46 *Mandatory.* Backpoling of trolleys shall be avoided wherever possible; but when necessary, backpoling shall be done only at slow speeds.

57.9-47 *Mandatory.* Parked railcars, unless held effectively by brakes, shall be blocked securely.

57.9-48 *Mandatory.* Railroad cars with braking systems, when in use, shall be equipped with effective brake shoes.

57.9-49 *Mandatory.* When in the dark or under conditions of limited visibility, all vehicles carrying loads which project beyond the sides or more than four feet beyond the rear of the vehicles shall display a warning light at the end of the projection; or in the light, a warning flag not less than 12 inches square shall be displayed at the end of the projection.

57.9-50 *Mandatory.* Railcars shall not be left on side tracks unless ample clearance is provided for traffic on adjacent tracks.

57.9-51 *Mandatory.* Persons shall not go over, under, or between cars unless the train is stopped and the motorman has been notified and the notice acknowledged.

57.9-52 *Mandatory.* Inability of a motorman to clearly recognize his brakeman's signals, when the train is under the direction of the brakeman, shall be construed by the motorman as a stop signal.

57.9-53 *Mandatory.* Water, debris, or spilled material which create hazards to moving equipment shall be removed.

57.9-54 *Mandatory.* Berms, bumper blocks, safety hooks, or similar means shall be provided to prevent overtravel and overturning at dumping locations.

57.9-55 *Mandatory.* Where there is evidence that the ground at a dumping place may fail to support the weight of a vehicle, loads shall be dumped back from the edge of the bank.

57.9-56 *Mandatory.* Where necessary, bumper blocks or the equivalent shall be provided at track dead ends.

57.9-57 *Mandatory.* Grizzlies, grates, and other stationary sizing devices shall be anchored securely.

57.9-58 *Mandatory.* If truck spotters are used, they shall be well in the clear while trucks are backing into dumping position and dumping; lights shall be used at night to direct trucks.

57.9-59 *Mandatory.* Public and permanent railroad crossings shall be posted with warning signs or signals, or shall be guarded when trains are passing and shall be planked or otherwise filled between the rails.

57.9-60 *Mandatory.* Where overhead clearance is restricted, warning devices shall be installed and the restricted area shall be conspicuously marked.

57.9-61 *Mandatory.* Stockpile and muckpile faces shall be trimmed to prevent hazards to personnel.

57.9-62 *Mandatory.* Rocks too large to be handled safely shall be broken before loading.

57.9-63 *Mandatory.* Ramps and dumping facilities shall—

(a) Be of substantial construction; and

(b) Have suitable width, clearance, and headroom to accommodate the equipment using the facilities.

57.9-64 *Mandatory.* Chute-loading installations shall be designed so that the men pulling chutes are not required to be in a hazardous position while loading cars.

57.9-65 *Mandatory.* Cars shall not be coupled, or uncoupled, manually from the inside of curves unless the railroad and cars are so designed to eliminate any hazard from manual coupling.

57.9-66 *Mandatory.* When a locomotive on one track is used to move equipment on a different track, a suitable chain, cable, or drawbar shall be used.

57.9-67 *Mandatory.* Facilities used to transport men to and from work areas shall not be overcrowded.

57.9-68 *Mandatory.* Lights, flares, or other warning devices shall be posted when parked equipment creates a hazard to vehicular traffic.

57.9-69 *Mandatory.* Tires shall be deflated before repairs on them are started and adequate means shall be provided to prevent wheel locking rims from creating a hazard during tire inflation.

57.9-70 *Mandatory.* A tow bar of substantial construction or other suitable means of control shall be used to tow heavy equipment. A substantial safety chain or wire rope shall be used in conjunction with any primary rigging.

57.9-71 *Mandatory.* Traffic rules including speed, signals, and warning signs shall be standardized at each mine and posted.

57.9-72 *Mandatory.* Persons attempting to free hangups shall be experienced persons who understand the hazards involved.

57.9-73 *Mandatory.* Defective equipment, removed from service as unsafe to operate, shall be tagged to prohibit further use until repairs are completed.

57.9-74 *Mandatory.* Dust shall be suitably controlled at muck piles, material transfer points, crushers, and on haulage roads where hazards to personnel may be created as a result of impaired visibility.

57.9-75 through 57.9-80 [Reserved]

SURFACE ONLY

57.9-81 and 57.9-82 [Reserved]

57.9-83 *Mandatory.* Where possible at least 30 inches continuous clearance from the farthest projection of moving railroad equipment shall be provided on at least one side of the tracks; all places where it is not possible to provide 30-inch clearance shall be marked conspicuously.

57.9-84 [Reserved]

57.9-85 *Mandatory.* Tools, materials and equipment shall not be transported with persons in rail cars and other vehicles and conveyances unless means have been provided to make such transportation safe.

57.9-86 [Reserved]

57.9-87 *Mandatory.* Heavy duty mobile equipment shall be provided with audible warning devices. When the operator of such equipment has an obstructed view to the rear, the equipment shall have either an automatic reverse signal alarm which is audible above the surrounding noise level or an observer to signal when it is safe to back up.

57.9-88 *Mandatory.* (a) Excluding equipment that is operated by remote control, all self-propelled track-type (crawler mounted) or wheeled (rubber-tired) scrapers; front-end loaders; dozers; tractors, including industrial and agricultural tractors but not including over-the-road type tractors (the type that pull trailers or vans on highways); and motor graders; and wheeled prime movers (a tractor of the type and kind normally used as the mode of power for rubber-tired scrapers); all as used in metal and nonmetal mining operations, with or without attachments, shall be used in such mining only when equipped with (1) Roll-Over Protective Structures (ROPS) in accordance with the requirements of paragraphs (b) through (g) of this standard, as applicable, and (2) seat belts meeting the requirements of the Society of Automotive Engineers (SAE), Motor Vehicle Seat Belts Assemblies—SAE J4c, approved November 1955, revised July 1965; Seat Belt Hardware Test Procedures—SAE J140a, approved April 1970, revised February 1973; Seat Belt Hardware Performance Requirements—SAE J141; Operator Protection for Wheel Type Agricultural and Industrial Tractors—SAE J333a, approved April 1968, revised July 1970, conforms to ASAE S305; and Seat Belts for Construction Equipment--SAE J386, approved March 1968; and, in accordance with paragraphs (b), (c), and (e) of this standard, as applicable.

(b) Except as provided in paragraph (e) all self-propelled equipment described in paragraph (a) of this standard and manufactured on or after the effective date of this standard shall be equipped with (1) ROPS meeting the requirements of paragraph (d), and (2) seat belts meeting the requirements of SAE J4c, J140a, J141, J333a, and J386 specified in paragraph (a) of this standard.

(c) All self-propelled equipment described in paragraph (a) of this standard manufactured prior to the effective date of this standard and after June 30, 1969, shall be equipped with ROPS meeting the requirements of paragraphs (d) through (g) of this standard as appropriate, and seat belts, no later than the dates specified below:

(1) Equipment manufactured between July 1, 1971, and the effective date of this standard shall be equipped with ROPS and seat belts no later than 6 months after the effective date of this standard.

(2) Equipment manufactured between July 1, 1970, and June 30, 1971, shall be equipped with ROPS and seat belts no later than 10 months after the effective date of this standard.

(3) Equipment manufactured between July 1, 1969, and June 30, 1970, shall be equipped with ROPS and seat belts no later than 16 months after the effective date of this standard.

(4) Nothing in this standard shall preclude the issuance of an order because of imminent danger.

(d) Except as provided in paragraph (e) of this standard, self-propelled equipment described in paragraph (a) of this standard shall be deemed in compliance with the ROPS requirements of this standard if the ROPS meet the following requirements:

(1) The ROPS complies with the Society of Automotive Engineers, SAE Recommended Practice, Critical Zone—Characteristics and Dimensions for Operators of Construction and Industrial Machinery—SAE J397, approved July 1969, or Deflection Limiting Volume for Laboratory Evaluation of Roll-Over Protective Structures (ROPS) and Falling Object Protective Structures (FOPS) of Construction and Industrial Vehicles—SAE J397a, approved July 1969, revised January 1972, editorial change July 1973; and, as appropriate, the ROPS and installation of the ROPS meet the requirements of either SAE Recommended Practice, Performance Criteria for Roll-Over Protective Structures (ROPS) for Earthmoving, Construction, Logging, and Industrial Vehicles—SAE J1040, approved April 1974, or any of the following applicable SAE standards or recommended practices.

(i) Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired, Self-Propelled Scrapers—SAE J320a, approved November 1967, revised July 1969, editorial change June 1970; or

(ii) Minimum Performance Criteria for Roll-Over Protective Structures for Prime Movers—SAE J320b, approved November 1967, revised January 1972, editorial change September 1972; or

(iii) Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired Front End Loaders and Rubber-Tired Dozers—SAE J394, approved July 1969, editorial change July 1970, or Minimum Performance Criteria for Roll-Over Protective Structures for Wheeled Front-End Loaders and Wheeled Dozers—SAE J394a, approved July 1969, revised March 1972, editorial change September 1972; or

(iv) Minimum Performance Criteria for Roll-Over Structures for Crawler Tractors and Crawler-Type Loaders—SAE J395, approved July 1969, editorial change July 1970, or Minimum Performance Criteria for Roll-Over Protective Structures for Track-Type Tractors and Track-Type Front-End Loaders—SAE J395a, approved July 1969, revised January 1972, editorial change September 1972; or

(v) Minimum Performance Criteria for Roll-Over Protective Structure for Motors-Graders— SAE J396, approved 1969, editorial change July 1970, or Minimum Performance Criteria for Roll-Over Protective Structures for Motor Graders—SAE J396a, approved July 1969, revised March 1972, editorial change September 1972; or

(vi) Operator Protection for Wheel Type Agricultural and Industrial Tractors—SAE J333a, approved April 1968, revised July 1970, conforms to ASAE S305; and Protective Frame Test Procedure and Performance Requirements—SAE J334a, approved April 1968, revised July 1970, conforms to ASAE S306.

(2) The ROPS is installed on the equipment in accordance with the recommendations of the ROPS manufacturer. If the installation includes bolts and nuts, the bolts

and nuts used to attach the ROPS to the equipment frame and to connect structural parts of the ROPS shall be SAE Grade 5 or 8 (SAE J429g and J995b).

(e) All self-propelled equipment described in paragraph (a) of this standard, manufactured prior to the effective date of this standard, shall be deemed in compliance with the standard if ROPS and seat belt installations meet the ROPS and seat belt requirements of the State of California; or the U.S. Army Corps of Engineers; or the Bureau of Reclamation; or MSHA coal mine regulations of the U.S. Department of Labor; or the Occupational Safety and Health Administration of the U.S. Department of Labor. The requirements in effect are:

(1) The State of California: Title 8 of the California Administrative Code: Construction Safety Orders, Article 10, "Haulage and Earth Moving," 1591(i) and 1596 (Register 70, No. 40—October 3, 1970); General Industry Safety Orders, Article 25, "Industrial Trucks, Tractors, Haulage Vehicles, and Earth Moving Equipment," 3650-55 (Register 72, No. 6—February 5, 1972); and Logging and Sawmill Safety Orders, Article 7, "Tractor Yarding," 5243 (Register 69, No. 10—March 8, 1969), all issued by the Division of Industrial Safety, State of California.

(2) U.S. Army Corps of Engineers: Manuals—Corps of Engineers, U.S. Army Safety-General Safety Requirements, EM-385-1-1 (March 1967), or Change 1, March 27, 1972.

(3) Bureau of Reclamation, U.S. Department of the Interior: Section 9, "Machinery and Mechanized Equipment," Safety and Health Regulations for Construction, Part II—Bureau of Reclamation (September 1971).

(4) Mine Safety and Health Administration, U.S. Department of Labor: Section 77.403a, Part 77, Title 30, Code of Federal Regulations—Mandatory Safety Standards, Surface Coal Mines and Surface Work Areas of Underground Coal Mines, promulgated in the FEDERAL REGISTER (39 FR 24006-24009).

(5) Occupational Safety and Health Administration, U.S. Department of Labor: Sections 1926.1001 and 1926.1002, Title 29, Code of Federal Regulations—Safety and Health Regulations for Construction, promulgated in the FEDERAL REGISTER (37 FR 27585-27590), and republished in the FEDERAL REGISTER (39 FR 22880-22886).

(f) Any alteration, repair, or welding of the ROPS and ROPS-to-vehicle frame mounts shall be performed only with prior approval and with instructions from the ROPS manufacturer or under the instructions of a registered professional engineer; and the manufacturer, or engineer, as the case may be, shall decide what qualifications the welders involved in this operation must have.

(g) Each ROPS shall have the following information permanently affixed to the structure:

(1) Manufacturer's or fabricator's name and address; and

(2) ROPS model number, if any; and

(3) Make and model numbers of the equipment on which the ROPS is designed to fit.

(4) For equipment already in existence when this standard goes into effect, a satisfactory substitute for the above-required information will be a certificate from either the manufacturer of the ROPS or a registered professional engineer to the effect that the ROPS does meet the performance standards and is appropriate for the piece of equipment upon which it is installed.

(h) Publications to which references are made in this standard are hereby incorporated by reference and made a part hereof. The incorporated publications are available at each Metal and Nonmetal Mine Safety and Health Subdistrict Office, MSHA. State of California safety orders are available from the State of California Office of Procurement, Documents Section, Post Office Box 20191, Sacramento, California 95820. The U.S. Army Corps of Engineers, Safety-General Safety Requirements are available from the U.S. Government Printing Office, Washington, D.C. 20402. Bureau of Reclamation Safety and Health Regulations for Construction are available from the Bureau of Reclamation, Division of Safety, Engineering and Research Center, Denver, Colorado 80225. SAE documents are available from the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 15096.

57.9-89 through 57.9-94 [Reserved]

UNDERGROUND ONLY

57.9-95 [Reserved]

57.9-96 *Mandatory.* Tools or materials, except properly located and secured rerailing devices, shall not be carried on top of locomotives. Tools or materials shall not be carried in the cab if they would interfere with the operation of the locomotive.

57.9-97 *Mandatory.* Trains shall be brought to a complete stop, then moved very slowly when coupling or uncoupling cars manually.

57.9-98 *Mandatory.* Makeshift couplings shall not be used.

57.9-99 *Mandatory.* Supplies, materials, and tools other than small handtools shall not be transported with men in man trip cars. Man trips shall be operated independently of ore and supply trips.

57.9-100 and 57.9-101 [Reserved]

57.9-102 *Mandatory.* When a signalmen is used during slushing operations he shall be positioned in a safe place.

57.9-103 *Mandatory.* Collars of open draw holes shall be kept free of muck and material.

57.9-104 *Mandatory.* Warning devices or conspicuous markings shall be installed where chute lips, ventilation doors, and obstructions create a hazard to persons on equipment.

57.9-105 *Mandatory.* To prevent rock from flying out when broken material is dumped into an empty chute—

(a) The chute shall be properly guarded prior to filling; or

(b) Sufficient material shall be left in the chute bottom.

57.9-106 *Mandatory.* Ample warning shall be given to men who may be affected by the draw or otherwise exposed to danger from chute-pulling operations.

57.9-107 *Mandatory.* Men shall not stand on broken rock or ore over draw points if there is danger that the chute will be pulled. Suitable platforms or safety lines shall be provided when work must be done in such areas.

57.9-108 and 57.9-109 [Reserved]

57.9-110 *Mandatory.* Shelter holes shall be provided to ensure the safety of men along haulageways where continuous clearance of at least 30 inches from the farthest projection of moving equipment on at least one side of the haulageway cannot be maintained.

57.9-111 *Mandatory.* Shelter holes shall be at least 4-feet wide, marked conspicuously with lights or reflective signs or reflective tape or reflectors or luminous paint, provide a minimum of 40-inch clearance from the farthest projection of moving equipment, and shall not be used for storage of timber, tools, or other materials unless a 40-inch clearance is maintained.

57.9-112 *Mandatory.* On rail haulage, trip lights shall be used on the rear of pulled trips and on the front of pushed trips.

57.9-113 *Mandatory.* Man trips shall be operated at speeds consistent with the condition of tracks and equipment used.

57.9-114 *Mandatory.* Where man trips are used, discharge and boarding points shall be designated. Men shall not board or leave moving man-trip cars.

57.9-115 *Mandatory.* Man trips shall be covered if there is danger of passengers contacting the trolley wire.

57.9-116 *Mandatory.* During shift changes the movement of rock or material trains shall be limited to areas where such trains could not present a hazard to men coming on or going off shift.

OMB CONTROL No. 1219-0064, paragraph 57.9-1. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12517, July 31, 1969, as amended at 35 FR 3674, Feb. 25, 1970; 37 FR 14374, July 19, 1972; 41 FR 23617, June 10, 1976; 42 FR 70105, Feb. 4, 1977; 42 FR 29422, June 8, 1977; 42 FR 57043, Oct. 31, 1977; 43 FR 12319, Mar. 24, 1978; 44 FR 31919, June 1, 1979; 44 FR 48530, Aug. 17, 1979; 45 FR 68935, Oct. 17, 1980; 47 FR 14706, Apr. 6, 1982]

§ 57.10 Aerial tramways.

SURFACE ONLY

57.10-1 *Mandatory.* Buckets shall not be overloaded, and feed shall be regulated to prevent spillage.

57.10-2 *Mandatory.* Inspection and maintenance of carriers (including loading and unloading mechanisms), ropes and supports, and brakes shall be performed by competent persons according to the recommendations of the manufacturer.

57.10-3 *Mandatory.* Any hazardous defects shall be corrected before the equipment is used.

57.10-4 *Mandatory.* Positive-action-type brakes and devices which apply the brakes automatically in the event of a power failure shall be provided on aerial tramways.

57.10-5 *Mandatory.* Track cable connections shall not obstruct the passage of carriage wheels.

57.10-6 *Mandatory.* Towers shall be suitably protected from swaying buckets.

57.10-7 *Mandatory.* Guard nets or other suitable protection shall be provided where tramways pass over roadways, walkways, or buildings.

57.10-8 *Mandatory.* Persons other than maintenance men shall not ride aerial tramways unless the following features are provided:

(a) Two independent brakes, each capable of holding the maximum load;

(b) Direct communication between terminals;

(c) Power drives with emergency power available in case of primary power failure; and

(d) Buckets equipped with positive locks to prevent accidental tripping or dumping.

57.10-9 *Mandatory.* Men shall not ride loaded buckets.

57.10-10 *Mandatory.* Where possible, aerial tramways shall not be started until the operator has ascertained that everyone is in the clear.

[34 FR 12517, July 31, 1969, as amended at 35 FR 3675, Feb. 25, 1970; 37 FR 14374, July 19, 1972; 44 FR 48530, Aug. 17, 1979]

§ 57.11 Travelways and escapeways.

TRAVELWAYS

GENERAL—SURFACE AND UNDERGROUND

57.11-1 *Mandatory.* Safe means of access shall be provided and maintained to all working places.

57.11-2 *Mandatory.* Crossovers, elevated walkways, elevated ramps, and stairways shall be of substantial construction, provided with handrails, and maintained in good condition. Where necessary, toeboards shall be provided.

57.11-3 *Mandatory.* Ladders shall be of substantial construction and maintained in good condition.

57.11-4 *Mandatory.* Portable rigid ladders shall be provided with suitable bases and placed securely when used.

57.11-5 *Mandatory.* Fixed ladders shall be anchored securely and installed to provide at least 3 inches of toe clearance.

57.11-6 *Mandatory.* Fixed ladders shall project at least 3 feet above landings, or substantial handholds shall be provided above the landings.

57.11-7 *Mandatory.* Wooden components of ladders shall not be painted except with a transparent finish.

57.11-8 [Reserved]

57.11-9 *Mandatory.* Walkways with outboard railings shall be provided wherever persons are required to walk alongside elevated conveyor belts. Inclined railed walkways shall be nonskid or provided with cleats.

57.11-10 *Mandatory.* Vertical clearance above stair steps shall be a minimum of seven (7) feet, or suitable warning signs or similar devices shall be provided to indicate an impaired clearance.

57.11-11 *Mandatory.* Persons using ladders shall face the ladders and have both hands free for climbing and descending.

57.11-12 *Mandatory.* Openings above, below, or near travelways through which men or materials may fall shall be protected by railings, barriers, or covers. Where it is impractical to install such protective devices, adequate warning signals shall be installed.

57.11-13 *Mandatory.* Crossovers shall be provided where it is necessary to cross conveyors.

57.11-14 *Mandatory.* Moving conveyors shall be crossed only at designated crossover points.

57.11-15 [Reserved]

57.11-16 *Mandatory.* Regularly used walkways and travelways shall be sanded, salted, or cleared of snow and ice as soon as practicable.

57.11-17 *Mandatory.* Fixed ladders shall not incline backwards.

57.11-18 through 57.11-24 [Reserved]

SURFACE ONLY

57.11-25 *Mandatory.* Fixed ladders, except on mobile equipment, shall be offset and have substantial railed landings at least every 30 feet unless backguards or equivalent protection, such as safety belts and safety lines, are provided.

57.11-26 *Mandatory.* Fixed ladders 70 degrees to 90 degrees from the horizontal and 30 feet or more in length shall have backguards, cages or equivalent protection, starting at a point not more than seven (7) feet from the bottom of the ladders.

57.11-27 *Mandatory.* Scaffolds and working platforms shall be of substantial construction and provided with handrails and maintained in good condition. Floorboards shall be laid properly and the scaffolds and working platform shall not be overloaded. Working platforms shall be provided with toeboards when necessary.

57.11-28 through 57.11-34 [Reserved]

UNDERGROUND ONLY

57.11-35 [Reserved]

57.11-36 *Mandatory.* Trap doors or adequate guarding shall be provided in ladderways at each level. Doors shall be kept operable.

57.11-37 *Mandatory.* Ladderways constructed after November 15, 1979, shall have a minimum unobstructed cross-sectional opening of 24 inches by 24 inches measured from the face of the ladder.

57.11-38 *Mandatory.* Before entering a manway where persons may be working or traveling, a warning shall be given by the person entering the manway and acknowledged by any person present in the manway.

57.11-39 [Reserved]

57.11-40 *Mandatory.* Travelways steeper than 35 degrees from the horizontal shall be provided with ladders or stairways.

57.11-41 *Mandatory.* Fixed ladders with an inclination of more than 70 degrees from the horizontal shall be offset with substantial landings at least every 30 feet or have landing gates at least every 30 feet.

57.11-42 through 57.11-49 [Reserved]

ESCAPEWAYS

UNDERGROUND ONLY

57.11-50 *Mandatory.* Every mine shall have two or more separate, properly maintained escapeways to the surface from the lowest levels which are so positioned that damage to one shall not lessen the effectiveness of the others. A method of refuge shall be provided while a second opening to the surface is being developed. A second escapeway is recommended, but not required, during the exploration or development of an ore body.

In addition to separate escapeways, a method of refuge shall be provided for every employee who cannot reach the surface from his working place through at least two separate escapeways within a time limit of one hour when using the normal exit method. These refuges must be positioned so that the employee can reach one of them within 30 minutes from the time he leaves his workplace.

57.11-51 *Mandatory.* Escape routes shall be:

(a) Inspected at regular intervals and maintained in safe, travelable condition; and

(b) Marked with conspicuous and easily read direction signs that clearly indicate the ways of escape.

57.11-52 *Mandatory.* Refuge areas shall be:

(a) Of fire-resistant construction, preferably in untimbered areas of the mine;

(b) Large enough to accommodate readily the normal number of men in the particular area of the mine;

(c) Constructed so they can be made gastight; and

(d) Provided with compressed air lines, waterlines, suitable handtools, and stopping materials.

57.11-53 *Mandatory.* A specific escape and evacuation plan and revisions thereof suitable to the conditions and mining system of the mine and showing assigned responsibilities of all key personnel in the event of an emergency shall be developed by the operator and set out in written form. Within 45 calendar days after promulgation of this standard a copy of the plan and revisions thereof shall be available to the Secretary or his authorized representative. Also, copies of the plan and revisions thereof shall be posted at locations convenient to all persons on the surface and underground. Such a plan shall be updated as necessary and shall be reviewed jointly by the operator and the Secretary or his authorized representative at least once every six months from the date of the last review. The plan shall include:

(a) Mine maps or diagrams showing directions of principal air flow, location of escape routes and locations of existing telephones, primary fans, primary fan controls, fire doors, ventilation doors, and refuge chambers. Appropriate portions of such maps or diagrams shall be posted at all shaft stations and in underground shops, lunchrooms, and elsewhere in working areas where men congregate;

(b) Procedures to show how the miners will be notified of emergency;

(c) An escape plan for each working area in the mine to include instructions showing how each working area should be evacuated. Each such plan shall be posted at appropriate shaft stations and elsewhere in working areas where men congregate;

(d) A fire fighting plan;

(e) Surface procedure to follow in an emergency, including the notification of proper authorities, preparing rescue equipment, and other equipment which may be used in rescue and recovery operations; and

(f) A statement of the availability of emergency communication and transportation facilities, emergency power and ventilation and location of rescue personnel and equipment.

57.11-54 *Mandatory.* Telephone or other voice communication shall be provided between the surface and refuge chambers and such systems shall be independent of the mine power supply.

57.11-55 *Mandatory.* Any portion of a designated escapeway which is inclined more than 30 degrees from the horizontal and that is more than 300 feet in vertical extent shall be provided with an emergency hoisting facility.

57.11-56 *Mandatory.* The procedure for inspection, testing and maintenance required by standard 57.19-120 shall be utilized at least every 30 days for hoists designated as emergency hoists in any evacuation plan.

57.11-57 [Reserved]

57.11-58 *Mandatory.* Each operator of an underground mine shall establish a check-in and check-out system which shall provide an accurate record of persons in the mine. These records shall be kept on the surface in a place chosen to minimize the danger of destruction by fire or other hazards. Every person underground shall carry a positive means of being identified.

57.11-59 *Mandatory.* For the protection of operators of hoists located underground which are part of the mine escape and evacuation plan required under standard 57.11-53, the hoist operator shall be provided with a respirable atmosphere completely independent of the mine atmosphere. This independent ventilation system shall convert, without contamination, to an approved and properly maintained 2-hour self-contained breathing apparatus to provide a safe means of escape for the hoist operator after the hoisting duties have been completed as prescribed in the mine escape and evacuation plan for that hoist. The hoist operator's independent ventilation system shall be provided by one of the following methods:

(a) A suitable enclosure equipped with a positive pressure ventilation system which may be operated continuously or be capable of immediate activation from within the enclosure during an emergency evacuation. Air for the enclosure's ventilation system shall be provided in one of the following ways—

(1) Air coursed from the surface through a borehole into the hoist enclosure directly or through a metal pipeline from such borehole; or

(2) Air coursed from the surface through metal duct work into the hoist enclosure, although this duct work shall not be located in timber-supported active workings; or

(3) Air supplied by air compressors located on the surface and coursed through metal pipe into the hoist enclosure.

A back-up system shall be provided for a hoist enclosure ventilation system provided by either of the methods set forth in (a)(2) and (a)(3) above. This back-up system shall consist of compressed air stored in containers connected to the enclosure. This back-up system shall provide and maintain a respirable atmosphere in the enclosure for a period of time equal to at least twice the time necessary to complete the evacuation of all persons designated to use that hoist as prescribed in the mine escape and evacuation plan required under standard 57.11-53; or

(b) An approved and properly maintained self-contained breathing apparatus system which shall consist of a mask connected to compressed air stored in containers adjacent to the hoist controls. The self-contained breathing system shall provide a minimum of 24 hours of respirable atmosphere to the hoist operator. In addition, the self-contained breathing system shall be capable of a quick connect with the approved 2-hour self-contained breathing apparatus above.

OMB CONTROL Nos. 1219-0046, paragraph 57.11-53 and 1219-0045, paragraph 57.11-58. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12517, July 31, 1969, as amended at 35 FR 3675, Feb. 25, 1970; 37 FR 14374, July 19, 1972; 38 FR 23382, Aug. 29, 1973; 39 FR 9653, Mar. 13, 1974; 42 FR 57043, Oct. 31, 1977; 44 FR 31919, June 1, 1979; 44 FR 48530, Aug. 17, 1979; 44 FR 48828, Nov. 30, 1979; 47 FR 14706, Apr. 6, 1982]

§ 57.12 Electricity.

GENERAL—SURFACE AND UNDERGROUND

57.12-1 *Mandatory.* Circuits shall be protected against excessive overloads by fuses or circuit breakers of the correct type and capacity.

57.12-2 *Mandatory.* Electric equipment and circuits shall be provided with switches or other controls. Such switches or controls shall be of approved design and construction and shall be properly installed.

57.12-3 *Mandatory.* Individual overload protection or short circuit protection shall be provided for the trailing cables of mobile equipment.

57.12-4 *Mandatory.* Electrical conductors shall be of a sufficient size and current-carrying capacity to ensure that a rise in temperature resulting from normal operations will not damage the insulating materials. Electrical conductors exposed to mechanical damage shall be protected.

57.12-5 *Mandatory.* Mobile equipment shall not run over power conductors, nor shall loads be dragged over power conductors, unless the conductors are properly bridged or protected.

57.12-6 *Mandatory.* Distribution boxes shall be provided with a disconnecting device for each branch circuit. Such disconnecting devices shall be equipped or designed in such a manner that it can be determined by visual observation when such a device is open and that the circuit is deenergized, and the distribution box shall be labeled to show which circuit each device controls.

57.12-7 *Mandatory.* Trailing cable and power-cable connections to junction boxes shall not be made or broken under load.

57.12-8 *Mandatory.* Power wires and cables shall be insulated adequately where they pass into or out of electrical compartments. Cables shall enter metal frames of motors, splice boxes, and electrical compartments only through proper fittings When insulated wires, other than cables, pass through metal frames, the holes shall be substantially bushed with insulated bushings.

57.12-9 [Reserved]

57.12-10 *Mandatory.* Telephone and low-potential signal wire shall be protected, by isolation or suitable insulation, or both, from contacting energized power conductors or any other power source.

57.12-11 *Mandatory.* High-potential electrical conductors shall be covered, insulated, or placed to prevent contact with low potential conductors.

57.12-12 *Mandatory.* The potential on bare signal wires accessible to contact by persons shall not exceed 48 volts.

57.12-13 *Mandatory.* Permanent splices and repairs made in power cables, including the ground conductor where provided, shall be: (a) Mechanically strong with electrical conductivity as near as possible to that of the original; (b) Insulated to a degree at least equal to that of the original, and sealed to exclude moisture; and, (c) Provided with damage protection as near as possible to that of the original, including good bonding to the outer jacket.

57.12-14 *Mandatory.* Power cables energized to potentials in excess of 150 volts, phase-to-ground, shall not be moved with equipment unless sleds or slings, insulated from such equipment, are used. When such energized cables are moved manually, insulated hooks, tongs, ropes, or slings shall be used unless suitable protection for persons is provided by other means. This does not prohibit pulling or dragging of cable by the equipment it powers when the cable is physically attached to the equipment by suitable mechanical devices, and the cable is insulated from the equipment in conformance with other standards in this part.

57.12-15 [Reserved]

57.12-16 *Mandatory.* Electrically powered equipment shall be deenergized before mechanical work is done on such equipment. Power switches shall be locked out or other measures taken which shall prevent the equipment from being energized without the knowledge of the individuals working on it. Suitable warning notices shall be posted at the power switch and signed by the individuals who are to do the work. Such locks or preventive devices shall be removed only by the persons who installed them or by authorized personnel.

57.12-17 *Mandatory.* Power circuits shall be deenergized before work is done on such circuits unless hot-line tools are used. Suitable warning signs shall be posted by the individuals who are to do the work. Switches shall be locked out or other measures taken which shall prevent the power circuits from being energized without the knowledge of the individuals working on them. Such locks, signs, or preventative devices shall be removed only by the person who installed them or by authorized personnel.

57.12-18 *Mandatory.* Principal power switches shall be labeled to show which units they control, unless identification can be made readily by location.

57.12-19 *Mandatory.* Where access is necessary, suitable clearance shall be provided at stationary electrical equipment or switchgear.

57.12-20 *Mandatory.* Dry wooden platforms, insulating mats, or other electrically nonconductive material shall be kept in place at all switchboards and power-control switches where shock hazards exist. However, metal plates on which a person normally would stand and which are kept at the same potential as the grounded, metal, non-current-carrying parts of the power switches to be operated may be used.

57.12-21 *Mandatory.* Suitable danger signs shall be posted at all major electrical installations.

57.12-22 *Mandatory.* Areas containing major electrical installations shall be entered only by authorized persons.

57.12-23 *Mandatory.* Electrical connections and resistor grids that are difficult or impractical to insulate shall be guarded, unless protection is provided by location.

57.12-24 [Reserved]

57.12-25 *Mandatory.* All metal enclosing or encasing electrical circuits shall be grounded or provided with equivalent protection. This requirement does not apply to battery-operated equipment.

57.12-26 *Mandatory.* Metal fencing and metal buildings enclosing transformers and switchgear shall be grounded.

57.12-27 *Mandatory.* Frame grounding or equivalent protection shall be provided for mobile equipment powered through trailing cables.

57.12-28 *Mandatory.* Continuity and resistance of grounding systems shall be tested immediately after installation, repair, and modification; and annually thereafter. A record of the resistance measured during the most recent test shall be made available on a request by the Secretary or his duly authorized representative.

57.12-29 [Reserved]

57.12-30 *Mandatory.* When a potentially dangerous condition is found it shall be corrected before equipment or wiring is energized.

57.12-31 [Reserved]

57.12-32 *Mandatory.* Inspection and cover plates on electrical equipment and junction boxes shall be kept in place at all times except during testing or repairs.

57.12-33 *Mandatory.* Hand-held electric tools shall not be operated at high potential voltages.

57.12-34 *Mandatory.* Portable extension lights, and other lights that by their location present a shock or burn hazard, shall be guarded.

57.12-35 *Mandatory.* Lamp sockets shall be of a weatherproof type where they are exposed to weather or wet conditions that may interfere with illumination or create a shock hazard.

57.12-36 *Mandatory.* Fuses shall not be removed or replaced by hand in an energized circuit, and they shall not otherwise be removed or replaced in an energized circuit unless equipment and techniques especially designed to prevent electrical shock are provided and used for such purpose.

57.12-37 *Mandatory.* Fuse tongs or hot-line tools, shall be used when fuses are removed or replaced in high-potential circuits.

57.12-38 *Mandatory.* Trailing cables shall be attached to machines in a suitable manner to protect the cable from damage and to prevent strain on the electrical connections.

57.12-39 *Mandatory.* Surplus trailing cables to shovels, cranes and similar equipment shall be—

(a) Stored in cable boats;

(b) Stored on reels mounted on the equipment; or

(c) Otherwise protected from mechanical damage.

57.12-40 *Mandatory.* Operating controls shall be installed so that they can be operated without danger of contact with energized conductors.

57.12-41 *Mandatory.* Switches and starting boxes shall be of safe design and capacity.

57.12-42 *Mandatory.* Both rails shall be bonded or welded at every joint and rails shall be crossbonded at least every 200 feet if the track serves as the return trolley circuit. When rails are moved, replaced, or broken bonds are discovered, they shall be rebonded within three working shifts.

57.12-43 and 57.12-44 [Reserved]

57.12-45 *Mandatory.* Overhead high-potential powerlines shall be installed as specified by the National Electrical Code.

57.12-46 [Reserved]

57.12-47 *Mandatory.* Guy wires of poles supporting high-voltage transmission lines shall meet the requirements for grounding or insulator protection of the National Electrical Safety Code, Part 2, entitled "Safety Rules for the Installation and Maintenance of Electric Supply and Communication Lines," (also referred to as National Bureau of Standards Handbook 81, Nov. 1, 1961) and Supplement 2 thereof issued March 1968, which are hereby incorporated by reference and made a part hereof. These publications and documents may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, or may be examined in any Metal and Nonmetal Mine Safety and Health District or Subdistrict Office of the Mine Safety and Health Administration.

57.12-48 *Mandatory.* Telegraph, telephone, or signal wires shall not be installed on the same crossarm with power conductors. When carried on poles supporting powerlines, they shall be installed as specified by the National Electrical Code.

57.12-49 [Reserved]

57.12-50 *Mandatory.* Trolley wires shall be installed at least seven (7) feet above rails where height permits, and aligned and supported to suitably control sway and sag.

57.12-51 and 57.12-52 [Reserved]

57.12-53 *Mandatory.* Ground wires for lighting circuits powered from trolley wires shall be connected securely to the ground-return circuit.

57.12-54 through 57.12-64 [Reserved]

SURFACE ONLY

57.12-65 *Mandatory.* Powerlines, including trolley wires, and telephone circuits shall be protected against short circuits and lightning.

57.12-66 *Mandatory.* Where metallic tools or equipment can come in contact with trolley wires or bare powerlines, the lines shall be guarded or deenergized.

57.12-67 *Mandatory.* Transformers shall be totally enclosed, or shall be placed at least 8 feet above the ground, or installed in a transformer house, or surrounded by a substantial fence at least 6 feet high and at least 3 feet from any energized parts, casings, or wiring.

57.12-68 *Mandatory.* Transformer enclosures shall be kept locked against unauthorized entry.

57.12-69 *Mandatory.* Each ungrounded conductor or telephone wire that leads underground and is directly exposed to lightning shall be equipped with suitable lightning arrestors of approved type within 100 feet of the point where the circuit enters the mine. Lightning arrestors shall be connected to a low resistance grounding medium on the surface and shall be separated from neutral grounds by a distance of not less than 25 feet.

57.12-70 [Reserved]

57.12-71 *Mandatory.* When equipment must be moved or operated near energized high-voltage powerlines (other than trolley lines) and the clearance is less than 10 feet, the lines shall be deenergized or other precautionary measures shall be taken.

57.12-72 through 57.12-79 [Reserved]

UNDERGROUND ONLY

57.12-80 *Mandatory.* Trolley wires and bare power conductors shall be guarded at man trip loading and unloading points, and at shaft stations. Where such trolley wires and bare power conductors are less than 7 feet above the rail, they shall be guarded at all points where men work or pass regularly beneath.

57.12-81 *Mandatory.* All metallic pipelines, 1,000 feet or more in length running parallel to trolley tracks, that are used as a ground return circuit shall be bounded to the return circuit rail at the ends of the pipeline and at intervals not to exceed 500 feet.

57.12-82 *Mandatory.* Powerlines shall be well separated or insulated from waterlines, telephone lines, and air lines.

57.12-83 *Mandatory.* Power cables in shafts and boreholes shall be fastened securely in such a manner as to prevent undue strain on the sheath, insulation, or conductors.

57.12-84 *Mandatory.* Disconnecting switches that can be opened safely under load shall be provided underground at all branch circuits extending from primary power circuits near shafts, adits, levels and boreholes.

57.12-85 *Mandatory.* Transformer stations shall be enclosed to prevent persons from unintentionally or inadvertently contacting energized parts.

57.12-86 *Mandatory.* Trolley and trolley feeder wire shall be installed opposite the clearance side of haulageways. However, this standard does not apply where physical limitations would prevent the safe installation or use of such trolley and trolley feeder wire.

57.12-87 [Reserved]

57.12-88 *Mandatory.* No splice, except a vulcanized splice or its equivalent, shall be made in a trailing cable within 25 feet of the machine unless the machine is equipped with a cable reel or other power feed cable payout-retrieval system. However, a temporary splice may be made to move the equipment for repair.

[34 FR 12517, July 31, 1969, as amended at 35 FR 3675, Feb. 25, 1970; 35 FR 18592, Dec. 8, 1970; 37 FR 14374, July 19, 1972; 39 FR 24320, July 1, 1974; 42 FR 29423, June 8, 1977; 42 FR 57043, Oct. 31, 1977; 44 FR 48531, Aug. 17, 1979]

§ 57.13 Compressed air and boilers.

GENERAL—SURFACE AND UNDERGROUND

57.13-1 *Mandatory.* All boilers and pressure vessels shall be constructed, installed, and maintained in accordance with the standards and specifications of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.

57.13-2 through 57.13-9 [Reserved]

COMPRESSED AIR

57.13-10 *Mandatory.* (a) Reciprocating-type air compressors rated over 10 horsepower shall be equipped with automatic temperature-actuated shut off mechanisms which shall be set or adjusted to the compressor when the normal operating temperature is exceeded by more than 25 percent.

(b) However, this standard does not apply to reciprocating-type air compressors rated over 10 horsepower if equipped with fusible plugs that were installed in the compressor discharge lines before November 15, 1979, and designed to melt at temperatures at least 50 degrees below the flash point of the compressors' lubricating oil.

57.13-11 *Mandatory.* Air receiver tanks shall be equipped with one or more automatic pressure-relief valves. The total relieving capacity of the relief valves shall prevent pressure from exceeding the maximum allowable working pressure in a receiver tank by not more than 10 percent. Air receiver tanks also shall be equipped with indicating pressure gages which accurately measure the pressure within the air receiver tanks.

57.13-12 *Mandatory.* Compressor air intakes shall be installed to insure that only clean, uncontaminated air enters the compressors.

57.13-13 and 57.13-14 [Reserved]

57.13-15 *Mandatory.* (a) Compressed-air receivers and other unfired pressure vessels shall be inspected by inspectors holding a valid National Board Commission and in accordance with the applicable chapters of the National Board Inspection Code, a Manual for Boiler and Pressure Vessel Inspectors, 1979. This code is incorporated by reference and made a part of this standard, may be examined at any Metal and Nonmetal Mine Safety and Health District Office of the Mine Safety and Health Administration, and may be obtained from the publisher, the National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229.

(b) Records of inspections shall be kept in accordance with requirements of the National Board Inspection Code, and the records shall be made available to the Secretary or his authorized representative.

57.13-16 [Reserved]

57.13-17 *Mandatory.* Compressor discharge pipes where carbon build-up may occur shall be cleaned periodically as recommended by the manufacturer, but no less frequently than once every two (2) years.

57.13-18 [Reserved]

57.13-19 *Mandatory.* Repairs involving the pressure system of compressors, receivers, or compressed-air-powered equipment shall not be attempted until the pressure has been bled off.

57.13-20 *Mandatory.* At no time shall compressed air be directed toward a person. When compressed air is used, all necessary precautions shall be taken to protect persons from injury.

57.13-21 *Mandatory.* Except where automatic shutoff valves are used, safety chains or other suitable locking devices shall be used at connections to machines of high-pressure hose lines of ¾-inch inside diameter or larger, and between high-pressure hose lines of ¾-inch inside diameter or larger, where a connection failure would create a hazard.

57.13-22 through 57.13-29 [Reserved]

BOILERS

57.13-30 *Mandatory.* (a) Fired pressure vessels (boilers) shall be equipped with water level gages, pressure gages, automatic pressure-relief valves, blowdown piping, and other safety devices approved by the American Society of Mechanical Engineers to protect against hazards from overpressure, flameouts, fuel interruptions and low water level, all as required by the appropriate sections, chapters and appendices listed in paragraph (b)(1) and (2) below.

(b) These gages, devices and piping shall be designed, installed, operated, maintained, repaired, altered, inspected, and tested by inspectors holding a valid National Board Commission and in accordance with the following listed sections, chapters and appendices:

(1) The ASME Boiler and Pressure Vessel Code, 1977, published by the American Society of Mechanical Engineers.

Section and Title

I Power Boilers

II Material Specifications—Part A—Ferrous

II Material Specifications—Part B—Nonferrous
II Material Specifications—Part C—Welding Rods, Electrodes, and Filler Metals
IV Heating Boilers
V Nondestructive Examination
VI Recommended Rules for Care and Operation of Heating Boilers
VII Recommended Rules for Care of Power Boilers

(2) The National Board Inspection Code, a Manual for Boiler and Pressure Vessel Inspectors, 1979, published by the National Board of Boiler and Pressure Vessel Inspectors.

Chapter and Title

I Glossary of Terms
II Inspection of Boilers and Pressure Vessels
III Repairs and Alterations to Boiler and Pressure Vessels by Welding
IV Shop Inspection of Boilers and Pressure Vessels
V Inservice Inspection of Pressure Vessels by Authorized Owner-User Inspection Agencies

Appendix and Title

A Safety and Safety Relief Valves
B Non-ASME Code Boilers and Pressure Vessels
C Storage of Mild Steel Covered Arc Welding Electrodes
D-R National Board "R" (Repair) Symbol Stamp
D-VR National Board "VR" (Repair of Safety and Safety Relief Valve) Symbol Stamp
D-VR1 Certificate of Authorization for Repair Symbol Stamp for Safety and Safety Relief Valves
D-VR2 Outline of Basic Elements of Written Quality Control System for Repairers of ASME Safety and Safety Relief Valves
D-VR3 Nameplate Stamping for "VR"
E Owner-User Inspection Agencies
F Inspection Forms

(c) Records of inspections and repairs shall be kept in accordance with the requirements of the ASME Boiler and Pressure Vessel Code and the National Board Inspection Code. The records shall be made available to the Secretary or his authorized representative.

(d) Sections of the ASME Boiler and Pressure Vessel Code, 1977, listed in paragraph (b)(1) above, and chapters and appendices of the National Board Inspection Code, 1979, listed in paragraph (b)(2) above, are incorporated by reference and made a part of this standard. These publications may be obtained from the publishers, the American Society of Mechanical Engineers, 345 East Forty-seventh Street, New York, N.Y. 10017, and the National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229. The publication may be examined at any Metal and Nonmetal Mine Safety and Health District Office of the Mine Safety and Health Administration.

57.13-31 through 57.13-34 [Reserved]

OMB CONTROL Nos. 1219-0056, paragraph 57.13-15 and 1219-0063, paragraph 57.13-30. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12517, July 31, 1969, as amended at 35 FR 3675, Feb. 25, 1970; 37 FR 14374, July 19, 1972; 44 FR 48532, Aug. 17, 1979; 44 FR 68828, 68829, Nov. 30, 1979; 47 FR 14706, Apr. 6, 1982]

§ 57.14 Use of equipment.

GUARDS

GENERAL—SURFACE AND UNDERGROUND

57.14-1 *Mandatory.* Gears; sprockets; chains; drive, head, tail, and takeup pulleys; flywheels; couplings; shafts; sawblades; fan inlets; and similar exposed moving machine parts which may be contacted by persons, and which may cause injury to persons, shall be guarded.

57.14-2 *Mandatory.* Overhead belts shall be guarded if the whipping action from a broken line would be hazardous to persons below.

57.14-3 *Mandatory.* Guards at conveyor-drive, conveyor-head, and conveyor-tail pulleys shall extend a distance sufficient to prevent a person from accidentally reaching behind the guard and becoming caught between the belt and the pulley.

57.14-4 and 57.14-5 [Reserved]

57.14-6 *Mandatory.* Except when testing the machinery, guards shall be securely in place while machinery is being operated.

57.14-7 *Mandatory.* Guards shall be of substantial construction and properly maintained.

57.14-8 *Mandatory.* Stationary grinding machines other than special bit grinders shall be equipped with:

(a) Peripheral hoods (less than 90° throat openings) capable of withstanding the force of a bursting wheel;

(b) Adjustable tool rests set as close as practical to the wheel; and

(c) Safety washers.

57.14-9 *Mandatory.* Grinding wheels shall be operated within the specifications of the manufacturer of the wheel.

57.14-10 *Mandatory.* Hand-held power tools, other than rock drills, shall be equipped with controls requiring constant hand or finger pressure to operate the tools or shall be equipped with friction or other equivalent safety devices.

57.14-11 *Mandatory.* Guards, shields, or other suitable protection shall be provided in areas where flying or falling materials present a hazard to personnel.

57.14-12 [Reserved]

57.14-13 *Mandatory.* Fork-lift trucks, front-end loaders, and bulldozers shall be provided with substantial canopies when necessary to protect the operator.

57.14-14 *Mandatory.* Face shields or goggles, in good condition, shall be worn when operating a grinding wheel.

57.14-15 through 57.14-24 [Reserved]

METHODS AND PROCEDURES

GENERAL—SURFACE AND UNDERGROUND

57.14-25 [Reserved]

57.14-26 *Mandatory.* Unsafe equipment or machinery shall be removed from service immediately.

57.14-27 *Mandatory.* Operation of machinery or equipment shall be assigned only to competent persons.

57.14-28 [Reserved]

57.14-29 *Mandatory.* Repairs or maintenance shall not be performed on machinery until the power is off and the machinery is blocked against motion, except where machinery motion is necessary to make adjustments.

57.14-30 *Mandatory.* Men shall not work on or from a piece of mobile equipment in a raised position until it has been blocked in place securely. This does not preclude the use of equipment specifically designed as elevated mobile work platforms.

57.14-31 *Mandatory.* Drive belts shall not be shifted while in motion unless the machines are provided with mechanical shifters.

57.14-32 *Mandatory.* Belts, chains, and ropes shall not be guided onto power-driven moving pulleys, sprockets, or drums with the hands except on slow moving equipment especially designed for hand feeding.

57.14-33 *Mandatory.* Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

57.14-34 *Mandatory.* Belt dressing shall not be applied manually while belts are in motion unless an aerosol-type dressing is used.

57.14-35 *Mandatory.* Machinery shall not be lubricated while in motion where a hazard exists, unless equipped with extended fittings or cups.

57.14-36 *Mandatory.* Tools and equipment shall not be used beyond the design capacity intended by the manufacturer, where such use may create a hazard to personnel.

57.14-37 through 57.14-44 [Reserved]

SURFACE ONLY

57.14-45 *Mandatory.* Welding operations shall be shielded and well-ventilated.

57.14-46 through 57.14-54 [Reserved]

UNDERGROUND ONLY

57.14-55 *Mandatory.* Welding operations shall be shielded and well-ventilated.

[34 FR 12517, July 31, 1969, as amended at 35 FR 3676, Feb. 25, 1970; 42 FR 7011, Feb. 4, 1977; 44 FR 48532, Aug. 17, 1979]

§ 57.15 Personal protection.

GENERAL—SURFACE AND UNDERGROUND

57.15-1 *Mandatory.* Adequate first-aid materials, including stretchers and blankets shall be provided at places convenient to all working areas. Water or neutralizing agents shall be available where corrosive chemicals or other harmful substances are stored, handled, or used.

57.15-2 *Mandatory.* All persons shall wear suitable hard hats when in or around a mine or plant where falling objects may create a hazard.

57.15-3 *Mandatory.* All persons shall wear suitable protective footwear when in or around an area of a mine or plant where a hazard exists which could cause an injury to the feet.

57.15-4 *Mandatory.* All persons shall wear safety glasses, goggles, or face shields or other suitable protective devices when in or around an area of a mine or plant where a hazard exists which could cause injury to unprotected eyes.

57.15-5 *Mandatory.* Safety belts and lines shall be worn when men work where there is danger of falling; a second person shall tend the lifeline when bins, tanks, or other dangerous areas are entered.

57.15-6 *Mandatory.* Special protective equipment and special protective clothing shall be provided, maintained in a sanitary and reliable condition and used whenever (1) hazards of process or environment, (2) chemical hazards, (3) radiological hazards, or (4) mechanical irritants are encountered in a manner capable of causing injury or impairment.

57.15-7 *Mandatory.* Protective clothing or equipment and face shields or goggles shall be worn when welding, cutting, or working with molten metal.

57.15-8 through 57.15-19 [Reserved]

SURFACE ONLY

57.15-20 *Mandatory.* Life jackets or belts shall be worn where there is danger from falling into water.

57.15-21 through 57.15-29 [Reserved]

UNDERGROUND ONLY

57.15-30 *Mandatory*—A 1-hour self-rescue device approved by the Mine Safety and Health Administration shall be made available by the operator to all personnel underground. Each operator shall maintain self-rescue devices in good condition.

57.15-31 *Mandatory*—(a) except as provided in paragraph (b) and (c) of this section, self-rescue devices meeting the requirements of standard 57.15-30 shall be worn or carried by all persons underground.

(b) Where the wearing or carrying of self-rescue devices meeting the requirements of standard 57.15-30 is hazardous to a person, such self-rescue devices shall be located at a distance no greater than 25 feet from such person.

(c) Where a person works on or around mobile equipment, self-rescue devices may be placed in a readily accessible location on such equipment.

[34 FR 12517, July 31, 1969, as amended at 35 FR 3676, Feb. 25, 1970; 35 FR 18592, Dec. 8, 1970; 39 FR 9653, Mar. 13, 1974; 39 FR 24320, July 1, 1974; 42 FR 57043, Oct. 31, 1977; 44 FR 48533, Aug. 17, 1979]

§ 57.16 Materials storage and handling.

GENERAL—SURFACE AND UNDERGROUND

57.16-1 *Mandatory*. Supplies shall not be stacked or stored in a manner which creates tripping or fall-of-material hazards.

57.16-2 *Mandatory*. (a) Bins, hoppers, silos, tanks and surge piles, where loose unconsolidated materials are stored, handled or transferred shall be—

(1) Equipped with mechanical devices or other effective means of handling materials so that during normal operations persons are not required to enter or work where they are exposed to entrapment by the caving or sliding of materials, and

(2) Equipped with supply and discharge operating controls. The controls shall be located so that spills or overruns will not endanger persons.

(b) Where persons are required to move around or over any facility listed in this standard, suitable walkways or passageways shall be provided.

(c) Where persons are required to enter any facility listed in this standard for maintenance or inspection purposes, ladders, platforms, or staging shall be provided. No person shall enter the facility until the supply and discharge of materials have ceased and the supply and discharge equipment is locked out. Persons entering the facility shall wear a safety belt or harness equipped with a lifeline suitably fastened. A second person, similarly equipped, shall be stationed near where the lifeline is fastened and shall constantly adjust it or keep it tight as needed, with minimum slack.

57.16-3 *Mandatory*. Materials that can create hazards if accidentally liberated from their containers shall be stored in a manner that minimizes the dangers.

57.16-4 *Mandatory*. Hazardous materials shall be stored in containers of a type approved for such use by recognized agencies; such containers shall be labeled appropriately.

57.16-5 *Mandatory*. Compressed and liquid gas cylinders shall be secured in a safe manner.

57.16-6 *Mandatory*. Valves on compressed gas cylinders shall be protected by covers when being transported or stored, and by a safe location when the cylinders are in use.

57.16-7 *Mandatory*. (a) Taglines shall be attached to loads that may require steadying or guidance while suspended.

(b) Hitches and slings used to hoist materials shall be suitable for the particular material handled.

57.16-8 [Reserved]

57.16-9 *Mandatory*. Men shall stay clear of suspended loads.

57.16-10 *Mandatory*. To protect personnel, material shall not be dropped from an overhead elevation until the drop area is first cleared of personnel and the area is then either guarded or a suitable warning is given.

57.16-11 *Mandatory*. Men shall not ride on loads being moved by cranes or derricks, nor shall they ride the hoisting hooks unless such method eliminates a greater hazard.

57.16-12 *Mandatory*. Chemical substances, including concentrated acids and alkalies, shall be stored to prevent inadvertent contact with each other or with other substances, where such contact could cause a violent reaction or the liberation of harmful fumes or gases.

57.16-13 *Mandatory*. Suitable warning shall be given before molten metal is poured and before a container of molten metal is moved.

57.16-14 *Mandatory*. Operator-carrying overhead cranes shall be provided with:

(a) Bumpers at each end of each rail;

(b) Automatic switches to halt uptravel of the blocks before they strike the hoist;

(c) Effective audible warning signals within easy reach of the operator; and

(d) A means to lockout the disconnect switch.

57.16-15 *Mandatory*. No person shall work from or travel on the bridge of an overhead crane unless the bridge is provided with substantial footwalks with toeboards and railings the length of the bridge.

57.16-16 *Mandatory*. Fork and other similar types of lift trucks shall be operated with the—

(a) Upright tilted back to steady and secure the load;

(b) Load in the upgrade position when ascending or descending grades in excess of 10 percent;

(c) Load not raised or lowered enroute except for minor adjustments; and

(d) Load-engaging device downgrade when traveling unloaded on all grades.

57.16-17 *Mandatory.* Where the stretching or contraction of a hoist rope could create a hazard, chairs or other suitable blocking shall be used to support conveyances at shaft landings before heavy equipment or material is loaded or unloaded.

57.16-18 through 57.16-34 [Reserved]

UNDERGROUND ONLY

57.16-35 [Reserved]

[34 FR 12517, July 31, 1969, as amended at 35 FR 3676, Feb. 25, 1970; 44 FR 48533, Aug. 17, 1979]

§ 57.17 Illumination.

SURFACE ONLY

57.17-1 *Mandatory.* Illumination sufficient to provide safe working conditions shall be provided in and on all surface structures, paths, walkways, stairways, switch panels, loading and dumping sites, and working areas.

57.17-2 through 57.17-9 [Reserved]

UNDERGROUND ONLY

57.17-10 *Mandatory.* Individual electric lamps shall be carried for illumination by all persons underground.

§ 57.18 Safety programs.

GENERAL—SURFACE AND UNDERGROUND

57.18-1 [Reserved]

57.18-2 *Mandatory.* (a) A competent person designated by the operator shall examine each working place at least once each shift for conditions which may adversely affect safety or health. The operator shall promptly initiate appropriate action to correct such conditions.

(b) A record that such examinations were conducted shall be kept by the operator for a period of one (1) year, and shall be made available for review by the Secretary or his authorized representative.

(c) In addition, conditions that may present an imminent danger which are noted by the person conducting the examination shall be brought to the immediate attention of the operator who shall withdraw all persons from the area affected (except persons referred to in section 104(c) of the Federal Mine Safety and Health Act of 1977) until the danger is abated.

57.18-3 through 57.18-5 [Reserved]

57.18-6 *Mandatory.* New employees shall be indoctrinated in safety rules and safe work procedures.

57.18-7 and 57.18-8 [Reserved]

57.18-9 *Mandatory.* When persons are working at the mine, a competent person designated by the mine operator shall be in attendance to take charge in case of an emergency.

57.18-10 *Mandatory.* Selected supervisors shall be trained in first aid. First aid training shall be made available to all interested employees.

57.18-11 [Reserved]

57.18-12 *Mandatory.* Emergency telephone numbers shall be posted at appropriate telephones.

57.18-13 *Mandatory.* A suitable communication system shall be provided at the mine to obtain assistance in the event of an emergency.

57.18-14 *Mandatory.* Arrangements shall be made in advance for obtaining emergency medical assistance and transportation for injured persons.

57.18-15 through 57.18-19 [Reserved]

SURFACE ONLY

57.18-20 *Mandatory.* No employee shall be assigned, or allowed, or be required to perform work alone in any area where hazardous conditions exist that would endanger his safety unless he can communicate with others, can be heard, or can be seen.

57.18-21 through 57.18-24 [Reserved]

UNDERGROUND ONLY

57.18-25 *Mandatory.* No employee shall be assigned, or allowed, or be required to perform work alone in any area where hazardous conditions exist that would endanger his safety unless his cries for help can be heard or he can be seen.

57.18-26 and 57.18-27 [Reserved]

57.18-28 *Mandatory.* (a) Within 6 months after promulgation of this standard and thereafter on an annual basis all persons who are required to go underground shall be instructed in the Mine Safety and Health Administration approved course contained in Bureau of Mines Instruction Guide 19, "Mine Emergency Training" (September 1972). The instruction shall be given by MSHA personnel or by persons who are certified by the District Manager of the area in which the mine is located.

(b) Within 6 months after promulgation of this standard and thereafter on an annual basis all persons who go underground shall be instructed in the Mine Safety and Health Administration course contained in Bureau of Mines Instruction Guide 2, "MSA W-65 Self-Rescuer" (March 1972) or Bureau of Mines Instruction Guide 3, "Permissible Drager 810 Respirator for

Self-Rescue" (March 1972). The instruction shall be given by MSHA personnel or by persons who are certified by the District Manager of the area in which the mine is located: provided, however, that if a Mine Safety and Health Administration instructor or a certified instructor is not immediately available such instruction of new employees in self-rescuers may be conducted by qualified company personnel who are not certified, but who have obtained provisional approval from the District Manager. Any person who has not had self-rescuer instruction within 12 months immediately preceding going underground shall be instructed in the use of self-rescuers before going underground.

(c) All instructional material, handouts, visual aids, and other such teaching accessories used by the operator in the courses prescribed in paragraphs (a) and (b) shall be available for inspection by the Secretary or his authorized representative.

(d) Records of all instruction shall be kept at the mine site or nearest mine office at least 2 years from the date of instruction. Upon completion of such instruction, copies of the record shall be submitted to the District Manager.

(e) The Bureau of Mines instruction guides to which reference is made in items (a) and (b) of this standard are hereby incorporated by reference and made a part hereof. The incorporated instruction guides are available and shall be provided upon request made to any Mine Safety and Health Administration training center or Metal and Nonmetal Mine Safety and Health Subdistrict Office.

OMB CONTROL Nos. 1219-0059, paragraph 57.18-2 and 1219-0057, paragraph 57.18-28. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12517, July 31, 1969, as amended at 35 FR 3676, Feb. 25, 1970; 38 FR 23382, Aug. 29, 1973; 39 FR 13969, Apr. 19, 1974; 44 FR 48533, Aug. 17, 1979; 47 FR 14706, Apr. 6, 1982; 47 FR 23641, May 28, 1982]

§ 57.19 Man hoisting.

The hoisting standards in this section apply to those hoists and appurtenances used for hoisting persons. However, where persons may be endangered by hoists and appurtenances used solely for handling ore, rock, and materials, the appropriate standards should be applied.

Emergency hoisting facilities should conform to the extent possible to safety requirements for other hoists, and should be adequate to remove the persons from the mine with a minimum of delay.

HOISTS

57.19-1 *Mandatory.* Hoists shall have rated capacities consistent with the loads handled and the recommended safety factors of the ropes used.

57.19-2 *Mandatory.* Hoists shall be anchored securely.

57.19-3 *Mandatory.* Belt, rope, or chains shall not be used to connect driving mechanisms to man hoists.

57.19-4 *Mandatory.* Any hoist used to hoist men shall be equipped with a brake or brakes which shall be capable of holding its fully loaded cage, skip, or bucket at any point in the shaft.

57.19-5 *Mandatory.* The operating mechanism of the clutch of every man-hoist drum shall be provided with a locking mechanism, or interlocked electrically or mechanically with the brake to prevent accidental withdrawal of the clutch.

57.19-6 *Mandatory.* Automatic hoists shall be provided with devices that automatically apply the brakes in the event of power failure.

57.19-7 *Mandatory.* All man hoists shall be provided with devices to prevent overtravel. When utilized in shafts exceeding 100 feet in depth, such hoists shall also be provided with overspeed devices.

57.19-8 *Mandatory.* Where creep or slip may alter the effective position of safety devices, friction hoists shall be equipped with synchronizing mechanisms that recalibrate the overtravel devices and position indicators.

57.19-9 *Mandatory.* An accurate and reliable indicator of the position of the cage, skip, bucket, or cars in the shaft shall be provided.

57.19-10 *Mandatory.* Hoist controls shall be placed or housed so that the noise from machinery or other sources will not prevent hoistmen from hearing signals.

57.19-11 *Mandatory.* Flanges on drums shall extend radially a minimum of 4 inches or three rope diameters beyond the last wrap, whichever is the lesser.

57.19-12 *Mandatory.* Where grooved drums are used, the grooves shall be of suitable size and pitch for the ropes used.

57.19-13 *Mandatory.* Where any diesel or similar fuel-injection engine is used to power a hoist, the engine shall be equipped with a damper or other cutoff in its air intake system. The control handle shall be clearly labeled to indicate that its intended function is for emergency stopping only.

57.19-14 *Mandatory.* In a friction hoist installation, tapered guides or other approved devices shall be installed above and below the limits of regular travel of the conveyance and arranged to prevent overtravel in the event of failure of other devices.

57.19-15 and 57.19-16 [Reserved]

57.19-17 *Mandatory.* Each electric hoist shall be equipped with a manually-operable switch that will initiate emergency braking action to bring the conveyance and the counterbalance safely to rest. This switch shall be located within reach of the hoistman in case the manual controls of the hoist fail.

57.19-18 *Mandatory.* When an overtravel by-pass switch is installed, the switch shall function so as to allow the conveyance to be moved through the overtravel position when the switch is held in the closed position by the hoistman. The overtravel bypass switch shall return automatically to the open position when released by the hoistman.

57.19-19 [Reserved]

WIRE ROPE

57.19-20 [Reserved]

57.19-21 *Mandatory.* The following static-load safety factors shall be used for selecting ropes to be used for hoisting men and for determining when such ropes shall be removed from man hoists.

Length of rope in shaft (feet)	Minimum factor of safety (new rope)	Minimum factor of safety (remove)
500 or less	8	6.4
501 to 1,000	7	5.8
1,001 to 2,000	6	5.0
2,001 to 3,000	5	4.3
3,001 or more	4	3.6

57.19-22 *Mandatory.* The end of the rope at the drum shall make at least one full turn on the drum shaft, or a spoke of the drum in the case of a free drum, and shall be fastened securely by means of rope clips or clamps. There shall be three full turns of cable or rope on the hoisting drum when the cable or rope is extended to its maximum working length. This standard does not apply to friction hoists.

57.19-23 [Reserved]

57.19-24 *Mandatory.* The rope shall be attached to the load by the thimble-and-clip method, the socketing method, or other approved method. If the socketing method is employed, zinc or its equivalent shall be used. The use of Babbitt metal or lead for socketing wire ropes is prohibited. If the thimble-and-clip method is used, the following shall be observed:

(a) The rope shall be attached to the load by passing one end around an oval thimble that is attached to the load bending the end back so that it is parallel to the long or "live" end of the rope and fastening the two parts of the rope together with clips.

(b) The U-bolt of each clip shall encircle the short or "dead" end of the rope and the distance between clips shall not be less than the figures given in the accompanying table.

(c) As a minimum the following number of clips or equivalent shall be used for various diameters of six-stand 19-wire plow steel ropes:

(Follow manufacturer's recommendations for other kinds of wire rope and clips.)

Diameter of rope, inches	Number of clips	Center-to-center spacing of clips, inches
3/4	4	4 1/2
7/8	4	5 1/4
1	4	6
1 1/8	5	6 3/4
1 1/4	5	7 1/2
1 3/8	6	8 1/4
1 1/2	6	9
1 5/8	6	9 3/4
1 3/4	7	10 1/2
1 7/8	8	11 1/4
2	8	12
2 1/8	8	13
2 1/4	8	14

(d) For all ropes less than three-quarter inch in diameter, at least four clips or equivalent shall be used.

(e) When special conditions require the attachment of a sling to the hoisting cable to handle equipment in the shaft, the sling shall be attached by clips or equivalent in accordance with the table in paragraph (c) of this standard.

57.19-25 [Reserved]

57.19-26 *Mandatory.* Safety device attachments to hoist ropes shall be selected, installed, and maintained according to manufacturers' specifications to minimize internal corrosion and weakening of the hoist rope.

57.19-27 [Reserved]

57.19-28 through 57.19-34 [Reserved]

HEADFRAMES AND SHEAVES

57.19-35 *Mandatory.* All headframes shall be constructed with suitable design considerations to allow for all dead loads, live loads, and wind loads.

57.19-36 *Mandatory.* Headframes shall be high enough to provide clearance for overtravel and safe stopping of the conveyance.

57.19-37 *Mandatory.* Fleet angles on hoists installed after November 15, 1979, shall not be greater than one and one-half degrees for smooth drums or two degrees for grooved drums.

57.19-38 *Mandatory.* Platforms with toeboards and handrails shall be provided around elevated head sheaves.

57.19-39 *Mandatory.* All personnel hoists, except emergency escape hoists and hoists with rope speeds of 200 feet per minute or less, installed after November 15, 1979 shall have drum and sheave tread diameters—

(1) Not less than 60 times the hoist rope diameter for slope or inclined shaft applications;

(2) Not less than 80 times the hoist rope diameter if the hoist ropes are one inch in diameter or greater, or not less than 60 times the hoist rope diameter if the hoist ropes are less than one inch in diameter for vertical shaft applications; or

(3) Not less than 100 times the hoist rope diameter for locked coil ropes.

57.19-40 *Mandatory.* Head, idler, knuckle, and curve sheaves shall have grooves of proper contour for the specific rope diameter used.

57.19-41 through 57.19-44 [Reserved]

CONVEYANCES

57.19-45 *Mandatory.* Man cages and skips used for hoisting or lowering employees or other persons in any vertical shaft or any incline shaft with an angle of inclination of forty-five (45) degrees from the horizontal shall be covered with a metal bonnet.

57.19-46 through 57.19-48 [Reserved]

57.19-49 *Mandatory.* Buckets shall not be used to hoist men except during shaft sinking operations, inspection, maintenance, and repairs.

57.19-50 *Mandatory.* Buckets used to hoist persons during vertical shaft sinking operations shall: (a) Be securely attached to a crosshead when traveling in either direction between the lower and upper crosshead parking locations; (b) Have overhead protection when the shaft depth exceeds 50 feet; (c) Have sufficient depth or a suitably designed platform to transport persons safely in a standing position; and (d) Have devices to prevent accidental dumping where the bucket is supported by a bail attached to its lower half.

57.19-51 and 57.19-52 [Reserved]

57.19-53 *Mandatory.* In shaft sinking where a platform is suspended by wire ropes, such ropes shall have an approved rating for the suspended load.

57.19-54 *Mandatory.* Where rope guides are used in shafts other than in shaft sinking operations, the rope guides shall be a type of lock coil construction.

HOISTING PROCEDURES

57.19-55 *Mandatory.* When a manually operated hoist is used, a qualified hoistman shall remain within hearing of the telephone or signal device at all times while any person is underground.

57.19-56 *Mandatory.* When automatic hoisting is used, a competent operator of the hoist shall be readily available at or near the hoisting device while any person is underground.

57.19-57 *Mandatory.* No person shall operate a hoist unless within the preceding 12 months he has had a medical examination by a qualified, licensed physician who shall certify his fitness to perform this duty. Such certification shall be available at the mine.

57.19-58 *Mandatory.* Only experienced hoistmen shall operate the hoist except in cases of emergency and in the training of new hoistmen.

57.19-59 and 57.19-60 [Reserved]

57.19-61 *Mandatory.* The safe speed for hoisting men shall be determined for each shaft, and this speed shall not be exceeded. Men shall not be hoisted at a speed faster than 2,500 feet per minute, except in an emergency.

57.19-62 *Mandatory.* Maximum normal operating acceleration and deceleration shall not exceed 6 feet per second per second. During emergency braking, the deceleration shall not exceed 16 feet per second per second.

57.19-63 *Mandatory.* Only authorized persons shall be in hoist rooms.

57.19-64 [Reserved]

57.19-65 *Mandatory.* Conveyances shall not be lowered by the brakes alone except during emergencies.

57.19-66 *Mandatory.* In shafts inclined over 45 degrees, the operator shall determine and post in the conveyance or at each shaft station the maximum number of persons permitted to ride in a hoisting conveyance at any one time. Each person shall be provided a minimum of 1.5 square feet of floor space.

57.19-67 *Mandatory.* During shift changes, an authorized person shall be in charge of each trip in which persons are hoisted.

57.19-68 *Mandatory.* Men shall enter, ride, and leave conveyances in an orderly manner.

57.19-69 *Mandatory.* Men shall not enter or leave conveyances which are in motion or after a signal to move the conveyance has been given to the hoistman.

57.19-70 *Mandatory.* Cage doors or gates shall be closed while men are being hoisted; they shall not be opened until the cage has come to a stop.

57.19-71 *Mandatory.* Men shall not ride in skips or buckets with muck, supplies, materials, or tools other than small hand tools.

57.19-72 *Mandatory.* When combinations of cages and skips are used in the same compartment, the cages shall be enclosed to protect personnel from flying material and the hoist speed reduced to man-speed as defined in standard 57.19-61, but not to exceed 1,000 feet per minute. Muck shall not be hoisted with personnel during shift changes.

57.19-73 *Mandatory.* Rock or supplies shall not be hoisted in the same shaft as men during shift changes, unless the compartments and dumping bins are partitioned to prevent spillage into the cage compartment.

57.19-74 *Mandatory.* Persons shall not ride the bail, rim, bonnet, or crosshead of any shaft conveyance except when necessary for inspection and maintenance, and then only when suitable protection for persons is provided.

57.19-75 *Mandatory.* Open hooks shall not be used to hoist buckets or other conveyances.

57.19-76 *Mandatory.* When men are hoisted in buckets, speeds shall not exceed 500 feet per minute and shall not exceed 200 feet per minute when within 100 feet of the intended station.

57.19-77 *Mandatory.* Buckets shall be stopped about 15 feet from the shaft bottom to await a signal from one of the crew on the bottom for further lowering.

57.19-78 *Mandatory.* All buckets shall be stopped after being raised about three (3) feet above the shaft bottom. A bucket shall be stabilized before a hoisting signal is given to continue hoisting the bucket to the crosshead. After a hoisting signal is given, hoisting to the crosshead shall be at a minimum speed. The signaling device shall be attended constantly until a bucket reaches the guides. When persons are hoisted, the signaling devices shall be attended until the crosshead has been engaged.

57.19-79 *Mandatory.* Where mine cars are hoisted by cage or skip, means for blocking cars shall be provided at all landings and also on the cage.

57.19-80 *Mandatory.* When tools, timbers, or other materials are being lowered or raised in a shaft by means of a bucket, skip, or cage, they shall be secured or so placed that they will not strike the sides of the shaft.

57.19-81 *Mandatory.* When conveyances controlled by a hoist operator are not in use, they shall be released and the conveyances shall be raised or lowered a suitable distance to prevent persons from boarding or loading the conveyances.

57.19-82 [Reserved]

57.19-83 *Mandatory.* A manually operated device shall be installed on each electric hoist that will allow the conveyance or counterbalance to be removed from an overtravel position. Such device shall not release the brake, or brakes, holding the overtravelled conveyance or counterbalance until sufficient drive motor torque has been developed to assure movement of the conveyance or counterbalance in the correct direction only.

57.19-84 through 57.19-89 [Reserved]

SIGNALING

57.19-90 *Mandatory.* There shall be at least two effective approved methods of signaling between each of the shaft stations and the hoist room, one of which shall be a telephone or speaking tube.

57.19-91 *Mandatory.* Hoist operators shall accept hoisting instructions only by the regular signaling system unless it is out of order. In such an event, and during other emergencies, the hoist operator shall accept instructions to direct movement of the conveyances only from authorized persons.

57.19-92 *Mandatory.* A method shall be provided to signal the hoist operator from cages or other conveyances at any point in the shaft.

57.19-93 *Mandatory.* A standard code of hoisting signals shall be adopted and used at each mine. The movement of a shaft conveyance on a "one bell" signal is prohibited.

57.19-94 *Mandatory.* A legible signal code shall be posted prominently in the hoist house within easy view of the hoistmen, and at each place where signals are given or received.

57.19-95 *Mandatory.* Hoisting signal devices shall be positioned within easy reach of persons on the shaft bottom or constantly attended by a person stationed on the lower deck of the sinking platform.

57.19-96 *Mandatory.* Any person responsible for receiving or giving signals for cages, skips, and mantrips when men or materials are being transported shall be familiar with the posted signaling code.

57.19-97 through 57.19-99 [Reserved]

SHAFTS

57.19-100 *Mandatory.* Shaft landings shall be equipped with substantial safety gates so constructed that materials will not go through or under them; gates shall be closed except when loading or unloading shaft conveyances.

57.19-101 *Mandatory.* Positive stopblocks or a derail switch shall be installed on all tracks leading to a shaft collar or landing.

57.19-102 *Mandatory.* A means shall be provided to guide the movement of a shaft conveyance.

57.19-103 *Mandatory.* Dumping facilities and loading pockets shall be constructed so as to minimize spillage into the shaft.

57.19-104 *Mandatory.* Suitable clearance at shaft stations shall be provided to allow safe movement of persons, equipment and materials.

57.19-105 *Mandatory.* A safe means of passage around open shaft compartments shall be provided on landings with more than one entrance to the shaft.

57.19-106 *Mandatory.* Shaft sets shall be kept in good repair and clean of hazardous material.

57.19-107 *Mandatory.* Hoistmen shall be informed when men are working in a compartment affected by that hoisting operation and "Men Working in Shaft" sign shall be posted at the hoist.

57.19-108 *Mandatory.* When men are working in a shaft "Men Working in Shaft" signs shall be posted at all devices controlling hoisting operations that may endanger such men.

57.19-109 *Mandatory.* Shaft inspection and repair work in vertical shafts shall be performed from substantial platforms equipped with bonnets or equivalent overhead protection.

57.19-110 *Mandatory.* A substantial bulkhead or equivalent protection shall be provided above men at work deepening a shaft.

57.19-111 *Mandatory.* Substantial fixed ladders shall be provided from the collar to as near the shaft bottom as practical during shaft-sinking operations, or an escape hoist powered by an emergency power source shall be provided. When persons are on the shaft bottom, a chain ladder, wire rope ladder, or other extension ladders shall be used from the fixed ladder or lower limit of the escape hoist to the shaft bottom.

57.19-112 through 57.19-119 [Reserved]

INSPECTION AND MAINTENANCE

57.19-120 *Mandatory.* A systematic procedure of inspection, testing, and maintenance of shafts and hoisting equipment shall be developed and followed. If it is found or suspected that any part is not functioning properly, the hoist shall not be used until the malfunction has been located and repaired or adjustments have been made.

57.19-121 *Mandatory.* Complete records shall be kept for three years of inspections, tests, and maintenance of shafts and hoisting equipment.

57.19-122 *Mandatory.* Parts used to repair hoists shall have properties that will insure the proper and safe function of the hoist.

57.19-123 *Mandatory.* Wire ropes shall be lubricated or treated with dressing as recommended or approved by the rope manufacturer.

57.19-124 *Mandatory.* Hoist ropes other than those on friction hoists shall be cut off at least six (6) feet above the highest connection to the conveyance at time intervals not to exceed one (1) year unless a shorter time is required by standard 57.19-126, or by conditions of use. The portion of the rope that is cut off shall be examined and inspected by a competent person for damage, corrosion, wear and fatique.

57.19-125 *Mandatory.* Hoist ropes wound in multiple layers shall have a length cut off at the drum end at least three (3) times during the anticipated life of the rope and whenever necessary as required by standard 57.19-126 to distribute the wear at change-of-layer and crossover points. The length of rope cut off shall not be a whole number multiple of the circumference of the drum.

57.19-126 *Mandatory.* Hoist ropes shall be examined over the entire active length at least every month to evaluate wear and possible damage. When such examinations or other inspections reveal that the rope is worn, and at least every six (6) months, caliper measurements or nondestructive tests shall be made at the following locations:

(a) Wherever wear is evident;

(b) Immediately above the socket or clip and above the safety connection;

(c) Where the rope rests on the sheaves;

(d) Where the ropes leave the drums when the conveyances are at the regular stopping point;

(e) Where a layer of rope begins to overlap another layer on the drum; and

(f) At 100 foot intervals (measurements shall be made midway between the last previously calipered points).

57.19-127 [Reserved]

57.19-128 *Mandatory.* Ropes shall not be used for hoisting when they have:

(a) More than six broken wires in any lay;

(b) Crown wires worn to less than 65 percent of the original diameter;

(c) A marked amount of corrosion or distortion; and

(d) A combination of similar factors individually less severe than those above but which in aggregate might create an unsafe condition.

57.19-129 *Mandatory.* Hoistmen shall examine their hoists and shall test overtravel, deadman controls, position indicators, and braking mechanisms at the beginning of each shift.

57.19-130 *Mandatory.* Before hoisting persons and to assure that the hoisting compartments are clear of obstructions, empty hoist conveyances shall be operated at least one round trip after—

(a) Any hoist or shaft repairs or related equipment repairs that might restrict or obstruct conveyance clearance;

(b) Any oversize or overweight material or equipment trips that might restrict or obstruct conveyance clearance;

(c) Blasting in or near the shaft that might restrict or obstruct conveyance clearance; or

(d) Remaining idle for one shift or longer.

57.19-131 *Mandatory.* Hoist conveyance connections shall be inspected at least once during any 24-hour period that the conveyance is used for hoisting persons.

57.19-132 *Mandatory.* (a) A performance drop test of hoist conveyance safety catches shall be made at the time of installation, or prior to installation, in a mockup of the actual installation. The test shall be certified to in writing by the manufacturer or by a registered professional engineer performing the test.

(b) After installation and before use, and at the beginning of any seven (7) day period during which the conveyance is to be used, the conveyance shall be suitably rested and the hoist rope slackened to test for the unrestricted functioning of the safety catches and their activating mechanisms.

(c) The safety catches shall be inspected by a competent person at the beginning of any 24-hour period that the conveyance is to be used.

57.19-133 *Mandatory.* Shafts that have not been inspected within the past 7 days shall not be used until an inspection has been conducted by a competent person.

57.19-134 *Mandatory.* Sheaves in operating shafts shall be inspected weekly and kept properly lubricated.

57.19-135 *Mandatory.* Rollers used in operating inclined shafts shall be lubricated, properly aligned, and kept in good repair.

OMB CONTROL Nos. 1219-0047, paragraph 57.19-57 and 1219-0029, paragraph 57.19-121. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12517, July 31, 1969, as amended at 35 FR 3676, Feb. 25, 1970; 35 FR 4515, Mar. 13, 1970; 35 FR 18592, Dec. 8, 1970; 37 FR 14374, July 19, 1972; 39 FR 24320, July 1, 1974; 41 FR 23617, June 10, 1976; 42 FR 29423, June 8, 1977; 42 FR 33289, June 30, 1977; 42 FR 57043, Oct. 31, 1977; 44 FR 31919, June 1, 1979; 44 FR 48534, Aug. 17, 1979; 47 FR 14706, Apr. 6, 1982]

§ 57.20 Miscellaneous.

GENERAL—SURFACE AND UNDERGROUND

57.20-1 *Mandatory.* Intoxicating beverages and narcotics shall not be permitted or used in or around mines. Persons under the influence of alcohol or narcotics shall not be permitted on the job.

57.20-2 *Mandatory.* An adequate supply of potable drinking water shall be provided at all active working areas.

(a) The common drinking cup and containers from which drinking water must be dipped or poured are prohibited.

(b) Where single service cups are supplied, a sanitary container for unused cups and a receptacle for used cups shall be provided.

(c) When water is cooled by ice, the ice shall either be of potable water or shall not come in contact with the water.

(d) Potable water outlets shall be posted.

(e) Potable water systems shall be constructed to prevent back flow or backsiphonage of non-potable water.

57.20-3 *Mandatory.* At all mining operations: (a) Workplaces, passageways, storerooms, and service rooms shall be kept clean and orderly. (b) The floor of every workplace shall be maintained in a clean and, so far as possible, a dry condition. Where wet processes are used, drainage shall be maintained, and false floors, platforms, mats, or other dry standing places shall be provided where practicable. (c) Every floor, working place, and passageway shall be kept free from protruding nails, splinters, holes, or loose boards, as practicable.

57.20-4 [Reserved]

57.20-5 *Mandatory.* Carbon tetrachloride shall not be used.

57.20-6 and 57.20-7 [Reserved]

57.20-8 *Mandatory.* (a) Toilet facilities shall be provided at locations that are compatible with the mine operations and that are readily accessible to mine personnel.

(b) The facilities shall be kept clean and sanitary. Separate toilet facilities shall be provided for each sex except where toilet rooms will be occupied by no more than one person at a time and can be locked from the inside.

57.20-9 *Mandatory.* Dusts suspected of being explosive shall be tested for explosibility. If tests prove positive, appropriate control measures shall be taken.

57.20-10 *Mandatory.* If failure of a water or silt retaining dam will create a hazard it shall be of substantial construction and inspected at regular intervals.

57.20-11 *Mandatory.* Areas where health or safety hazards exist that are not immediately obvious to employees shall be barricaded, or warning signs shall be posted at all approaches. Warning signs shall be readily visible, legible, display the nature of the hazard, and any protective action required.

57.20-12 *Mandatory.* Toxic materials used in conjunction with or discarded from mining or milling of a product shall be plainly marked or labeled so as to positively identify the nature of the hazard and the protective action required.

57.20-13 *Mandatory.* Receptacles with covers shall be provided at suitable locations and used for the disposal of waste food and associated materials. They shall be emptied frequently and shall be maintained in a clean and sanitary condition.

57.20-14 *Mandatory.* No person shall be allowed to consume or store food or beverages in a toilet room nor in any area exposed to a toxic material.

57.20-15 through 57.20-19 [Reserved]

SURFACE ONLY

57.20-20 *Mandatory.* Access to unattended mine openings shall be restricted by gates or doors, or the openings shall be fenced and posted.

57.20-21 *Mandatory.* Upon abandonment of a mine, the owner or operator shall effectively close or fence off all surface openings down which persons could fall or through which persons could enter. Upon or near all such safeguards, trespass warnings and appropriate danger notices shall be posted.

57.20-22 through 57.20-29 [Reserved]

UNDERGROUND ONLY

57.20-30 [Reserved]

57.20-31 *Mandatory.* In areas where dangerous accumulations of water, gas, mud, or fire atmosphere could be encountered, men shall be removed to safe places before blasting.

57.20-32 *Mandatory.* Telephones or other two-way communication equipment with instructions for their use shall be provided for communication from underground operations to the surface.

[34 FR 12517, July 31, 1969, as amended at 35 FR 3677, Feb. 25, 1970; 42 FR 29424, June 8, 1977; 42 FR 57044, Oct. 31, 1977; 44 FR 31919, June 1, 1979; 44 FR 48535, Aug. 17, 1979]

§ 57.21 Gassy mines.

Gassy mines shall be operated in accordance with all mandatory standards in this part. Such mines shall also be operated in accordance with the mandatory standards in this section. The standards in this section apply only to underground operations.

MINE CLASSIFICATION

57.21-1 *Mandatory.* A mine shall be deemed gassy, and thereafter operated as a gassy mine, if:

(a) The State in which the mine is located classifies the mine as gassy; or

(b) Flammable gas emanating from the orebody or the strata surrounding the orebody has been ignited in the mine; or

(c) A concentration of 0.25 percent or more, by air analysis, of flammable gas emanating only from the orebody or the strata surrounding the orebody has been detected not less than 12 inches from the back, face, or ribs in any open workings; or

(d) The mine is connected to a gassy mine.

57.21-2 *Mandatory.* Flammable gases detected only while unwatering mines or flooded sections of mines or during other mine reclamation operations shall not be used to permanently classify a mine gassy. During such periods that any flammable gas is present in the mine, the affected areas of the mine shall be operated in accordance with appropriate standards in this Section 57.21.

57.21-3 through 57.21-9 [Reserved]

FIRE PREVENTION AND CONTROL

57.21-10 *Mandatory.* Men shall not smoke or carry smoking materials, matches, or lighters underground. The operator shall institute a reasonable program to ensure that persons entering the mine do not carry smoking materials, matches, or lighters.

57.21-11 *Mandatory.* Except when necessary for welding or cutting, open flames shall not be used in other than fresh air or in places where flammable gases are present or may enter the air current.

57.21-12 *Mandatory.* Immediately before and continuously during welding or cutting with an arc or open flame or soldering with an open flame, in other than fresh air, or in places where methane is present or may enter the air current, a competent person shall test for methane with a device approved by the Secretary for detecting methane.

57.21-13 *Mandatory.* Welding or cutting with an arc or open flame or soldering with an open flame shall not be performed in atmospheres containing more than 1 percent of methane as determined by a device approved by the Secretary for detecting methane.

57.21-14 through 57.21-19 [Reserved]

VENTILATION

57.21-20 *Mandatory.* Main fans shall be:

(a) Installed on the surface.

(b) Installed to permit prompt reversal of airflow.

(c) Powered electrically.

(d) Installed in noncombustible housing provided with noncombustible air ducts.

(e) Offset not less than 15 feet from the nearest side of the mine opening to which the fan is connected. The fan installation shall be equipped with explosion-doors or a weak-wall having an area at least equivalent to the cross-sectional area of the airway. Such doors or weak-wall shall be in direct line with possible explosion forces.

(f) Provided with an automatic signal device to give warning or alarm should the fan system malfunction. The signal device shall be so located that it can be seen or heard by a responsible person at all times when persons are underground.

57.21-21 *Mandatory.* Main fans shall be:

(a) Operated continuously while persons are underground except when stopped or slowed down for fan maintenance and/or fan adjustments and related ventilation system adjustments and compliance is made with the provisions of mandatory standard 57.21-24.

(b) Provided with pressure-recording gages which shall be examined daily for good operating condition. The charts of such gages shall be changed after completing one revolution.

(c) Inspected daily and logs kept of such inspections and of fan maintenance. Charts and logs shall be retained for a minimum of one year. Such records and charts shall be available for inspection by the Secretary or his duly authorized representative.

57.21-22 *Mandatory.* The main intake and return air currents in mines shall be in separate shafts, slopes, or drifts, except that during shaft or slope development, vent tubing may be used in the same opening. Until a second opening to the surface can be provided, single shafts used for intake and return air shall be provided with a curtain wall or partition.

57.21-23 *Mandatory.* When single shafts are used for intake and return the curtain wall or partition shall be constructed of reinforced concrete or equivalent and provided with pressure relief devices.

57.21-24 *Mandatory.* (a) At mines where a single main fan is used and such fan stops, or at mines where multiple main fans are used and all such fans stop, the operator shall take the following immediate action:

(1) Withdraw all persons from the affected active workings.

(2) Deenergize the power in affected active workings.

(3) Withdraw all persons from the mine when a 1.0 percent concentration of methane in air is measured in any active working.

If ventilation has been interrupted for more than 15 minutes, all working places and active workings where methane may accumulate shall be examined by a competent person(s). The power shall not be restored or persons permitted to reenter the affected active workings until the competent person(s) has determined the methane concentration in such active workings is less than 1.0 percent.

(b) At mines where multiple main fans are used and one or more but not all fans stop, and air flow in intake and return air courses is maintained, the operator shall take the following immediate action:

(1) Monitor the air in all active workings for methane content.

(2) Withdraw all persons from, and deenergize the power, in all active workings when a 1.0 percent concentration of methane in the air is measured.

(3) Comply with all related mandatory standards in section 57.21.

57.21-25 *Mandatory.* When there has been a failure of mine ventilation other than a failure of a main fan as described in standard 57.21-24, the operator shall take the following immediate actions:

(a) Withdraw all persons from the affected active workings.

(b) Deenergize the power in affected active workings. The power shall not be restored or persons permitted to reenter the affected active workings until a competent person(s) has determined that the methane concentration in such active workings is less than 1.0 percent.

57.21-26 [Reserved]

57.21-27 *Mandatory.* When the main fan or fans have been shut down with all men out of the mine, no person, other than those competent to examine the mine, or other authorized persons, shall go underground until the fans have been started and the mine is examined for methane and other hazards and declared safe.

57.21-28 *Mandatory.* Booster fans shall be:

(a) Operated by permissible drive units maintained in permissible condition.

(b) Operated only in air containing less than 1.0 percent methane.

(c) Kept in continuous operation when persons are in active workings of the mine affected by such fans.

57.21-29 *Mandatory.* Booster fans shall be:

(a) Provided with an automatic signal device to give warning or alarm should the fan system malfunction. The signal device shall be so located that it can be seen or heard by a responsible person at all times when persons are underground.

(b) Equipped with a device that automatically deenergizes the power in affected active workings should the fan system malfunction.

(c) Provided with air locks, the doors of which open automatically should the fan stop.

(d) Equipped with two sets of controls capable of starting, stopping, and reversing the fans. One set of controls shall be located at the fans. A second set of controls shall be at another location remote from the fans.

57.21-30 *Mandatory.* Auxiliary fans shall be of a permissible type, maintained in permissible condition, so located and operated to avoid recirculation of air. Auxiliary fans shall not be used to ventilate any working place during the interruption of normal mine ventilation. If the auxiliary fan is stopped or fails, the electrical equipment in the affected area shall be stopped and the power disconnected at the power source until ventilation in the affected area is restored. Tests shall be made at the fan for methane before auxiliary fans are started. The air passing over or through auxiliary fan units shall not exceed 1.0 percent of methane.

57.21-31 *Mandatory.* Auxiliary fans shall be inspected by competent persons at least twice each operating shift.

57.21-32 [Reserved]

57.21-33 *Mandatory.* The volume and velocity of the current of air coursed through all active areas shall be sufficient to dilute, render harmless, and carry away methane smoke, fumes, and dust.

57.21-34 *Mandatory.* The quantity of air coursed through the last open crosscut in pairs or sets of entries or through other ventilation openings nearest the face, shall be at least 6,000 cubic feet per minute, or 9,000 cubic feet per minute in longwall and continuous miner sections.

57.21-35 *Mandatory.* At least once each week, a qualified person shall measure the volume of air entering the main intakes and leaving the main returns, the volume of the intake and return of each split, and the volume through the last open crosscuts or other ventilation openings nearest the active faces. Records of such measurements shall be kept in a book on the surface.

57.21-36 *Mandatory.* Permanently installed battery-charging stations and transformer stations in combustible areas shall be ventilated by separate splits of air conducted directly to return air courses. Permanently installed means stations that are intended to exist for one year or more.

57.21-37 [Reserved]

57.21-38 *Mandatory.* Changes in ventilation that materially affect the main air current or any split thereof and may affect the safety of persons in the mine shall be made only when the mine is idle. Only those persons engaged in making such changes shall be permitted in the mine during the change. Power shall be removed from the areas affected by the change before work starts and not restored until the effect of the change has been ascertained and the affected areas determined to be safe by a qualified person.

57.21-39 *Mandatory.* If methane gas in excess of 1.0 percent is detected in the air not less than 12 inches from the back, face, or rib of an underground working place or places, adjustments shall be made in the ventilation immediately so that the concentration of methane gas in such air is reduced to 1.0 percent or less. While such changes or adjustments are underway and until they have been achieved, power to electric equipment located in such place shall be cut off, no other work shall be permitted in such place, and due precautions shall be carried out under the direction of the operator or his agent so as not to endanger other areas of the mine.

57.21-40 *Mandatory.* If 1.5 percent or higher concentration of methane gas is present in air returning from an underground working place or places, or is present in the air not less than 12 inches from the back, face, or rib of an underground working place, all men other than those persons referred to in section 104(c) of the Federal Mine Safety and Health Act of 1977 shall be withdrawn from the area of the mine endangered by such methane gas until the concentration of methane in such areas is reduced to 1.0 percent or less.

57.21-41 *Mandatory.* Air that has passed by an opening of any unsealed abandoned area and contains 0.25 percent or more of methane shall be coursed directly to a return airway. Examinations of such air shall be conducted during the preshift examinations required by § 57.21-59.

57.21-42 *Mandatory.* Air that has passed through an abandoned panel or area which is inaccessible or unsafe for inspection shall not be used to ventilate any working place in such mine. No air which has been used to ventilate an area from which the pillars have been removed shall be used to ventilate any working place in such mine, except that such air, if it does not contain 0.25 volume per centum or more of methane, may be used to ventilate enough advancing working places immediately adjacent to the line of retreat to maintain an orderly sequence of pillar recovery on a set of entries.

57.21-43 *Mandatory.* Abandoned areas shall be sealed or ventilated; areas that are not sealed shall be barricaded and posted against unauthorized entry.

57.21-44 *Mandatory.* Seals shall be of substantial construction. Exposed surfaces shall be made of fire-resistant material or, if the commodity mined is combustible, seals shall be made of incombustible material.

57.21-45 *Mandatory.* One or more seals of every sealed area shall be fitted with a pipe and a valve or cap to permit sampling of the atmosphere and measurement of the pressure behind such seals.

57.21-46 *Mandatory.* Crosscuts shall be made at intervals not in excess of 100 feet between entries and between rooms.

57.21-47 [Reserved]

57.21-48 *Mandatory.* Line brattice or other suitable devices shall be installed from the last open crosscut to a point near the face to assure positive air flow to the face of every active underground working place, unless the Secretary or his authorized representative permits an exception to this requirement.

57.21-49 *Mandatory.* Brattice cloth shall be of flame-resistant material.

57.21-50 *Mandatory.* Damaged brattices shall be repaired promptly.

57.21-51 *Mandatory.* Crosscuts shall be provided where practicable at or within eighteen (18) feet of the face of drifts, entries, and rooms before the workings are abandoned in any unsealed area of the mine. When crosscuts are not practicable, line brattice or other suitable means of ventilating shall be provided to the drifts, entries, or rooms.

57.21-52 *Mandatory.* Entries or rooms shall not be started off entries beyond the last open crosscuts, except that room necks and entries not to exceed 18 feet in depth may be turned off entries beyond the last open crosscuts if such room necks or entries are kept free of accumulations of methane by use of line brattice or other adequate means.

57.21-53 *Mandatory.* Stoppings in crosscuts between intake and return airways, on entries other than room entries, shall be built of solid, substantial material; exposed surfaces shall be made of fire-resistant material or, if the material mined is combustible, stoppings shall be made of incombustible material.

57.21-54 [Reserved]

57.21-55 *Mandatory.* The main ventilation shall be so arranged by means of air locks, overcasts, or undercasts that the passage of trips or persons does not cause interruptions of air currents. Where air locks are impracticable, single doors may be used if they are attended constantly while the areas of the mine affected by the doors are being worked, unless they are operated mechanically or are self-closing.

57.21-56 *Mandatory.* Air locks shall be ventilated sufficiently to prevent accumulations of flammable gas inside the locks.

57.21-57 *Mandatory.* Doors which control the flow of air by being closed shall be kept closed, except when persons or equipment are passing through such doorways. Doors shall be plainly marked to indicate whether they shall be closed or open for ventilation control purposes.

57.21-58 *Mandatory.* Overcasts and undercasts shall be:

(a) Constructed tightly of incombustible material. (b) Of sufficient strength to withstand possible falls from the back. (c) Kept clear of obstruction.

57.21-59 *Mandatory.* Preshift examinations shall be made of all working areas by qualified persons within 3 hours before any workmen, other than the examiners, enter the mine.

57.21-60 [Reserved]

57.21-61 *Mandatory.* Only qualified examiners and persons authorized to correct the dangerous conditions shall enter places or areas where danger signs are posted.

57.21-62 *Mandatory.* Danger signs shall not be removed until the dangerous conditions have been corrected.

57.21-63 [Reserved]

57.21-64 *Mandatory.* Each operator shall use permissible devices accepted by the Secretary of Labor for detecting flammable gases, oxygen deficiency, carbon monoxide, and other air contaminants. Such permissible devices shall be provided and maintained in serviceable and permissible condition. In the detection of flammable gases, a permissible flame safety lamp may be used only as a supplementary testing device.

57.21-65 *Mandatory.* At intervals not greater than seven (7) days, the mine foreman (or other competent person designated by the mine foreman) shall examine for hazardous conditions and for compliance with health and safety standards, and shall test for methane and carbon monoxide. The tests shall be made with approved devices at the following locations:

(a) In the return of each split where it enters the main return;

(b) Adjacent to retreat areas, if accessible;

(c) At seals;

(d) In the main return;

(e) In at least one entry of each intake and return airway;

(f) In idle workings; and

(g) In unsealed abandoned workings, as conditions permit.

57.21-66 *Mandatory.* The mine foreman or other designated official shall read and countersign promptly the reports of the required examinations made by competent persons. Where such reports disclose hazardous conditions, the affected employees shall be so informed and such conditions shall be corrected promptly. If such conditions create an imminent danger, the operator shall withdraw all persons from, or prevent, any person from entering, as the case may be, the area affected by such conditions, except those persons referred to in section 104(c) of the Federal Mine Safety and Health Act of 1977 until such danger is abated. A responsibile mine official at the next highest level of authority, if such level exists, shall also read and countersign at least weekly the required reports to insure that proper inspections have been made and remedial action taken.

57.21-67 *Mandatory.* All gassy mines shall be ventilated mechanically.

57.21-68 *Mandatory.* Airflow shall be maintained in all intake and return air courses of a mine. When multiple main fans are used, such ventilation systems shall not develop neutral areas (areas without perceptible air movement).

57.21-69 *Mandatory.* In mines ventilated by a combination of multiple blowing or multiple exhausting main fans, each main fan installation shall be equipped with noncombustible doors designed and positioned so that, in the event of failure of a main fan, these doors will automatically close to prevent air reversal through the fan. The doors shall be located so that they are not in direct line with forces which would come out of the mine, should an explosion occur.

57.21-70 through 57.21-74 [Reserved]

EQUIPMENT

57.21-75 [Reserved]

57.21-76 *Mandatory.* Diesel-powered equipment shall not be taken into or operated in places where methane exceeds 1.0 percent at any point not less than 12 inches from the back, face, or rib.

57.21-77 *Mandatory.* Trolley wires and trolley feeder wires shall be on intake air and shall not extend into the last open crosscut or other ventilation opening. Such wires shall be kept at least 150 feet from pillar recovery workings.

57.21-78 *Mandatory.* Only permissible equipment maintained in permissible condition shall be used beyond the last open crosscut or in places where dangerous quantities of flammable gases are present or may enter the air current.

57.21-79 *Mandatory.* Only permissible distribution boxes shall be used in working places and other places where 1 percent or more of methane may be present or may enter the air current.

57.21-80 *Mandatory.* A methane monitoring device (methane monitor), approved by the Secretary of Labor, shall be installed and properly maintained on all continuous miners and longwall face equipment. The sensing unit of the methane monitor shall be positioned as close to the working face as practicable. When the concentration of methane is 1.0 percent or more, the monitor shall give a warning and deenergize the equipment automatically when the concentration reaches 1.5 percent. The methane monitor also shall de-energize such equipment automatically when the monitor is not functioning properly.

57.21-81 [Reserved]

57.21-82 through 57.21-89 [Reserved]

ILLUMINATION

57.21-90 *Mandatory.* Only permissible electric lamps shall be used for portable illumination underground.

57.21-91 through 57.21-94 [Reserved]

EXPLOSIVES

57.21-95 *Mandatory.* Explosives not designated as permissible by the Bureau of Mines or the Mine Safety and Health Administration shall not be used in any underground gassy mine until the Bureau of Mines and State Inspector of Mines have given written approval for each such specific explosive to be used.

57.21-96 *Mandatory.* The Mine Safety and Health Administration and the State Inspector of Mines, in granting approval referred to in standard § 57.21-95, shall provide the operator with a written list of conditions for using the specific explosives covered by the approval and adapted to the mining operation.

57.21-97 *Mandatory.* Blasts in gassy mines shall be initiated electrically, and multiple-shot blasts shall be initiated only with millisecond-delay detonators. Permissible blasting units of capacity suitable for the number of holes in a round to be blasted shall be used unless the round is fired from the surface when all men are out of the mine.

57.21-98 *Mandatory.* Boreholes shall be stemmed as prescribed for the explosives used.

57.21-99 *Mandatory.* When blasting on shift, examinations for methane shall be made immediately before firing each shot or round, and again before other work is performed. Examinations shall be made by competent persons with devices approved by the Secretary for detecting methane.

57.21-100 *Mandatory.* Shots or rounds shall not be fired in places where 1.0 percent or more of methane is present at a point no less than 12 inches from the back, face, or rib. Tests to determine the presence of methane shall be made by a competent person with devices approved by the Secretary for detecting methane.

57.21-101 *Mandatory.* Shots and rounds shall be fired by competent persons.

OMB Control Nos. 1219-0030, paragraph 57.21-21 and 1219-0031, paragraph 57.21-35. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[34 FR 12517, July 31, 1969, as amended at 35 FR 3677, Feb. 25, 1970; 35 FR 4515, Mar. 13, 1970; 35 FR 18592, Dec. 8, 1970; 41 FR 23618, June 10, 1976; 42 FR 29424, June 8, 1977; 42 FR 33289, June 30, 1977; 42 FR 57044, Oct. 31, 1977; 44 FR 31920, June 1, 1979; 44 FR 48535, Aug. 17, 1979; 45 FR 68935, Oct. 17, 1980; 47 FR 14706, Apr. 6, 1982]

§ 57.26 Procedures.

NOTIFICATION OF COMMENCEMENT OF OPERATIONS AND CLOSING OF MINES

57.26-1 *Mandatory.* The owner, operator, or person in charge of any metal and nonmetal mine shall notify the nearest Mine Safety and Health Administration and Metal and Nonmetal Mine Safety and Health Subdistrict Office before starting operations, of the approximate or actual date mine operation will commence. The notification shall include the mine name, location, the company name, mailing address, person in charge, and whether operations will be continuous or intermittent.

When any mine is closed, the person in charge shall notify the nearest subdistrict office as provided above and indicate whether the closure is temporary or permanent.

[38 FR 23382, Aug. 29, 1973, as amended at 43 FR 12319, Mar. 24, 1978]

SUBCHAPTER O—COAL MINE SAFETY AND HEALTH

PART 70—MANDATORY HEALTH STANDARDS — UNDERGROUND COAL MINES

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NOTE: Nomenclature changes appear at 43 FR 12319, Mar. 24, 1978; 43 FR 43458, Sept 26, 1978.

Subpart A—General

AUTHORITY: Secs. 101 and 103(h) of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 and 1299 (30 U.S.C. 811 and 813(h)).

SOURCE: 45 FR 24000, Apr. 8, 1980, unless otherwise noted.

§ 70.1 Scope.

This Part 70 sets forth mandatory health standards for each underground coal mine subject to the Federal Mine Safety and Health Act of 1977.

§ 70.2 Definitions.

For the purpose of this Part 70, the term:

(a) "Act" means the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173, as amended by Pub. L. 95-164.

(b) "Active workings" means any place in a coal mine where miners are normally required to work or travel.

(c) "Certified person" means an individual certified by the Secretary in accordance with § 70.202 (Certified person; sampling) to take respirable dust samples required by this part or certified in accordance with § 70.203 (Certified person; maintenance and calibration) to perform the maintenance and calibration of respirable dust sampling equipment as required by this part.

(d) "Concentration" means a measure of the amount of a substance contained per unit volume of air.

(e) "Designated area" means an area of a mine identified by the operator in the plan required under § 75.316 (Ventilation system and methane and dust control plan) of this title and approved by the District Manager.

(f) "Designated occupation" means the occupation on a mechanized mining unit that has been determined by results of respirable dust samples to have the greatest respirable dust concentration.

(g) "District Manager" means the manager of the Coal Mine Safety and Health District in which the mine is located.

(h) "Mechanized mining unit" means: (1) A unit of mining equipment including hand loading equipment used for the production of material; or (2) a specialized unit which utilizes mining equipment other than specified in § 70.207(e) (Bimonthly sampling; mechanized mining units).

(i) "MRE instrument" means the gravimetric dust sampler with a four channel horizontal elutriator developed by the Mining Research Establishment of the National Coal Board, London, England.

(j) "MSHA" means the Mine Safety and Health Administration of the Department of Labor.

(k) "Normal production shift" means (1) a production shift during which the amount of material produced in a mechanized mining unit is at least 50 percent of the average production reported for the last set of five valid samples; or (2) a production shift during which any amount of material is produced by a new mechanized mining unit, until a set of five valid samples is taken.

(l) "Production shift" means (1) with regard to a mechanized mining unit, a shift during which material is produced, or (2) with regard to a designated area of a mine, a shift during which material is produced and routine day-to-day activities are occurring in the designated area.

(m) "Quartz" means crystalline silicon dioxide (SiO_2) not chemically combined with other substances and having a distinctive physical structure.

(n) "Respirable dust" means dust collected with a sampling device approved by the Secretary and the Secretary of Health and Human Services in accordance with Part 74 (Coal Mine Dust Personal Sampler Units) of this title. Sampling device approvals issued by the Secretary of the Interior and Secretary of Health, Education, and Welfare are continued in effect.

(o) "Secretary" means the Secretary of Labor or his delegate.

(p) "Valid respirable dust sample" means a respirable dust sample collected and submitted as required by this part, and not voided by MSHA.

[45 FR 24000, Apr. 8, 1980, as amended at 47 FR 28095, June 29, 1982]

Subpart B—Dust Standards

AUTHORITY: Secs. 101 and 103(h) of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 and 1299 (30 U.S.C. 811 and 813(h)).

SOURCE: 45 FR 24001, Apr. 8, 1980, unless otherwise noted.

§ 70.100 Respirable dust standards.

(a) Each operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which each miner in the active workings of each mine is exposed at or below 2.0 milligrams of respirable dust per cubic meter of air as measured with an approved sampling device and in terms of an equivalent concentration determined in accordance with § 70.206 (Approved sampling devices; equivalent concentrations).

(b) Each operator shall continuously maintain the average concentration of respirable dust within 200 feet outby the working faces of each section in the intake airways at or below 1.0 milligrams of respirable dust per cubic meter of air as measured with an approved sampling device and in terms of an equivalent concentration determined in accordance with § 70.206 (Approved sampling devices; equivalent concentrations).

§ 70.101 Respirable dust standard when quartz is present.

When the respirable dust in the mine atmosphere of the active workings contains more than 5 percent quartz, the operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which each miner in the active workings is exposed at or below a concentration of respirable dust, expressed in milligrams per cubic meter of air as measured with an approved sampling device and in terms of an equivalent concentration determined in accordance with § 70.206 (Approved sampling devices; equivalent concentrations), computed by dividing the percent of quartz into the number 10.

Example: The respirable dust associated with a mechanized mining unit or a designated area in a mine contains quartz in the amount of 20%. Therefore, the average concentration of respirable dust in the mine atmosphere associated with that mechanized mining unit or designated area shall be continuously maintained at or below 0.5 milligrams of respirable dust per cubic meter of air ($10/20=0.5$ mg/m^3).

Subpart C—Sampling Procedures

AUTHORITY: Secs. 101 and 103(h) of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 and 1299 (30 U.S.C. 811 and 813(h)).

SOURCE: 45 FR 24001, Apr. 8, 1980, unless otherwise noted.

§ 70.201 Sampling; general requirements.

(a) Each operator shall take respirable dust samples of the concentration of respirable dust in the active workings of the mine as required by this part with a sampling device approved by the Secretary and the Secretary of Health and Human Services under Part 74 (Coal Mine Dust Personal Sampler Units) of this title.

(b) Sampling devices shall be worn or carried directly to and from the mechanized mining unit or designated area to be sampled and shall be operated portal to portal. Sampling devices shall remain operational during the entire shift or for 8 hours, whichever time is less.

(c) Upon request from the District Manager, the operator shall submit the date on which collecting any respirable dust samples required by this part will begin.

(d) During the time for abatement fixed in a citation for violation of § 70.100 (Respirable dust standards) or § 70.101 (Respirable dust standard when quartz is present), the operator shall take corrective action to lower the concentration of respirable dust to within the permissible concentration and then sample each production shift until five valid respirable dust samples are taken.

[45 FR 24000, Apr. 8, 1980, as amended at 47 FR 28095, June 29, 1982]

§ 70.202 Certified person; sampling.

(a) The respirable dust sampling required by this part shall be done by a certified person.

(b) To be certified, a person shall pass the MSHA examination on sampling of respirable coal mine dust.

(c) A person may be temporarily certified by MSHA to take respirable dust samples if the person receives instruction from an authorized representative of the Secretary in the methods of collecting and submitting samples under this rule. The temporary certification shall be withdrawn if the person does not successfully complete the examination conducted by MSHA on sampling of respirable coal mine dust within six months from the issue date of the temporary certification.

§ 70.203 Certified person; maintenance and calibration.

(a) Approved sampling devices shall be maintained and calibrated by a certified person.

(b) To be certified, a person shall pass the MSHA examination on maintenance and calibration procedures for respirable dust sampling equipment.

(c) A person may be temporarily certified by MSHA to maintain and calibrate approved sampling devices if the person receives instruction from an authorized representative of the Secretary in the maintenance and calibration procedures for respirable dust sampling equipment under this rule. The temporary certification shall be withdrawn if the person does not successfully complete the examination conducted by MSHA on maintenance and calibration procedures within six months from the issue date of the temporary certification.

§ 70.204 Approved sampling devices; maintenance and calibration.

(a) Approved sampling devices shall be maintained as approved under Part 74 (Coal Mine Dust Personal Sampler Units) of this title and calibrated in accordance with MSHA Informational Report No. 1121, "Standard Calibration and Maintenance Procedures for Wet Test Meters and Coal Mine Respirable Dust Samplers (Supersedes IR 1073)," by a person certified in accordance with § 70.203 (Certified person; maintenance and calibration).

(b) Approved sampling devices shall be calibrated at the flowrate of 2.0 liters of air per minute, or at a different flowrate as prescribed by the Secretary and the Secretary of Health and Human Services for the particular device, before they are put into service and at intervals not to exceed 200 hours of operating time thereafter.

(c) A calibration mark shall be placed on the flowmeter of each approved sampling device to indicate the proper position of the float when the sampler is operating at a flowrate of 2.0 liters of air per minute or other flowrate prescribed by the Secretary and the Secretary of Health and Human Services for the particular device. The standard to denote proper flow is when the lowest part of the float is tangent to the top of the calibration mark.

(d) Approved sampling devices shall be tested and examined immediately before each sampling shift and necessary external maintenance shall be performed to assure that the sampling devices are clean and in proper working condition by a person certified in accordance with § 70.202 (Certified person; sampling) or § 70.203 (Certified person; maintenance and calibration). This testing and examination shall include the following:

(1) Testing the voltage of each battery while under actual load to assure the battery is fully charged. The voltage for nickel cadmium cell batteries shall not be lower than the product of the number of cells in the battery pack multiplied by 1.25. The voltage for other than nickel cadmium cell batteries shall not be lower than the product of the number of cells in the battery pack multiplied by the manufacturer's nominal voltage per cell value;

(2) Examination of all components of the cyclone to assure that they are clean and free of dust and dirt;

(3) Examination of the inner surface of the cyclone on the approved sampling device to assure that it is free of scoring;

(4) Examination of the external tubing on the approved sampling device to assure that it is clean and free of leaks, and;

(5) Examination of the clamping and positioning of the cyclone body, vortex finder and cassette to assure that they are rigid, in alignment, and firmly in contact.

(e) In accordance with 5 U.S.C. 552(a), MSHA Informational Report No. 1121 referenced in paragraph (a) of this section is hereby incorporated by reference and made a part of this section as if it was set forth in full. The incorporated publication is available without charge at each Coal Mine Safety and Health District and Subdistrict office of MSHA and is on file at the Office of the Federal Register Information Center. Any future amendments to MSHA Informational Report No. 1121 will be announced in the FEDERAL REGISTER. This incorporation by reference was approved March 25, 1980, by the Director of the Office of the Federal Register.

[45 FR 24000, Apr. 8, 1980, as amended at 47 FR 28095, June 29, 1982]

§ 70.205 Approved sampling devices; operation; air flowrate.

(a) Sampling devices approved in accordance with Part 74 (Coal Mine Dust Personal Sampler Units) of this title shall be operated at the flowrate of 2.0 liters of air per minute, or at a different flowrate as prescribed by the

Secretary and the Secretary of Health and Human Services for the particular device.

(b) Except as provided in paragraph (d) of this section, each approved sampling device shall be examined each shift by a person certified in accordance with § 70.202 (Certified person; sampling) during the second hour after being put into operation to assure that the sampling device is operating properly and at the proper flowrate. If the proper flowrate is not maintained, necessary adjustments shall be made by the certified person.

(c) Each sampling device shall be examined each shift by a person certified in accordance with § 70.202 (Certified person; sampling) during the last hour of operation to assure that the sampling device is operating properly and at the proper flowrate. If the proper flowrate is not maintained, the respirable dust sample shall be transmitted to MSHA with a notation by the certified person on the dust data card stating that the proper flowrate was not maintained.

(d) Paragraph (b) of this section shall not apply if the approved sampling device is being operated in a breast or chamber of an anthracite coal mine where the full box mining method is used.

[45 FR 24000, Apr. 8, 1980, as amended at 47 FR 28095, June 29, 1982]

§ 70.206 Approved sampling devices; equivalent concentrations.

The concentration of respirable dust shall be determined by dividing the weight of dust in milligrams collected on the filter of an approved sampling device by the volume of air in cubic meters passing through the filter and then converting that concentration to an equivalent concentration as measured with an MRE instrument. To convert a concentration of respirable dust as measured with an approved sampling device to an equivalent concentration of respirable dust as measured with an MRE instrument, the concentration of respirable dust measured with the approved sampling device shall be multiplied by the constant factor prescribed by the Secretary for the approved sampling device used, and the product shall be the equivalent concentration as measured with an MRE instrument.

§ 70.207 Bimonthly sampling; mechanized mining units.

(a) Each operator shall take five valid respirable dust samples from the designated occupation in each mechanized mining unit during each bimonthly period beginning with the bimonthly period of November 1, 1980. Designated occupation samples shall be collected on consecutive normal production shifts or normal production shifts each of which is worked on consecutive days. The bimonthly periods are:

January 1-February 28 (29)
March 1-April 30
May 1-June 30
July 1-August 31
September 1-October 31
November 1-December 31.

(b) When the respirable dust standard is changed in accordance with § 70.101 (Respirable dust standard when quartz is present), respirable dust sampling of mechanized mining units shall begin on the first production shift during the next bimonthly period following notification of such change from MSHA.

(c) Upon issuance of a citation for a violation of § 70.100(a) (Respirable dust standards) or § 70.101 (Respirable dust standard when quartz is present) involving a designated occupation in a mechanized mining unit, paragraphs (a) and (b) of this section shall not apply to that unit until the violation is abated in accordance with § 70.201(d) (Sampling; general requirements).

(d) Each designated occupation sample shall be taken on a normal production shift. If a normal production shift is not achieved, the sample for that shift may be voided by MSHA. However, any sample, regardless of production, with a respirable dust concentration greater than 2.5 milligrams per cubic meter of air will be used to determine the average concentration for that mechanized mining unit.

(e) Unless otherwise directed by the District Manager, the designated occupation samples shall be taken by placing the sampling device as follows:

(1) *Conventional section using cutting machine.* On the cutting machine operator or on the cutting machine within 36 inches inby the normal working position;

(2) *Conventional section shooting off the solid.* On the loading machine operator or on the loading machine within 36 inches inby the normal working position;

(3) *Continuous mining section other than auger-type.* On the continuous mining machine operator or on the continuous mining machine within 36 inches inby the normal working position;

(4) *Continuous mining machine; auger-type.* On the jacksetter who works nearest the working face on the return air side of the continuous mining machine or at a location that represents the maximum concentration of dust to which the miner is exposed;

(5) *Scoop section using cutting machine.* On the cutting machine operator or on the cutting machine within 36 inches inby the normal working position;

(6) *Scoop section, shooting off the solid.* On the coal drill operator or on the coal drill within 36 inches inby the normal working position;

(7) *Longwall section.* On the miner who works nearest the return air side of the longwall working face or along the working face on the return side within 48 inches of the corner;

(8) *Hand loading section with a cutting machine.* On the cutting machine operator or on the cutting machine within 36 inches inby the normal working position;

(9) *Hand loading section shooting off the solid.* On the hand loader exposed to the greatest dust concentration or at a location that represents the maximum concentration of dust to which the miner is exposed;

(10) *Anthracite mine sections.* On the hand loader exposed to the greatest dust concentration or at a location that represents the maximum concentration of dust to which the miner is exposed.

(f)(1) Each mechanized mining unit will be assigned a four digit identification number by MSHA. The mechanized mining unit shall retain that identification number regardless of where the unit relocates within the mine.

(2) When two sets of mining equipment are provided in a series of working places and only one production crew is employed at any given time on either set of mining equipment, the two sets of equipment shall be identified as a single mechanized mining unit. When two or more mechanized mining units are simultaneously engaged in the production of material within the same working section, each such mechanized mining unit shall be identified separately.

§ 70.208 Bimonthly sampling; designated areas.

(a) Each operator shall take one valid respirable dust sample from each designated area on a production shift during each bimonthly period beginning with the bimonthly period of December 1, 1980. The bimonthly periods are:

February 1-March 31
April 1-May 31
June 1-July 31
August 1-September 30
October 1-November 30
December 1-January 31.

(b) When the respirable dust standard is changed in accordance with § 70.101 (Respirable dust standard when quartz is present), respirable dust sampling of designated areas shall begin on the first production shift during the next bimonthly period following notification of such change from MSHA.

(c) Upon notification from MSHA that any respirable dust sample taken from a designated area to meet the requirements of paragraph (a) or (b) of this section exceeds the applicable standard in § 70.100 (Respirable dust standards) or § 70.101 (Respirable dust standard when quartz is present), the operator shall take five valid respirable dust samples from that designated area within 15 calendar days. The operator shall begin such sampling on the first day on which there is a production shift following the day of receipt of notification.

(d) Upon issuance of a citation for a violation of § 70.100 (Respirable dust standards) or § 70.101 (Respirable dust standard when quartz is present) involving a designated area, paragraphs (a), (b) and (c) of this section shall not apply to that designated area until the violation is abated in accordance with § 70.201(d) (Sampling; general requirements).

(e) Designated area samples shall be collected at locations to measure respirable dust generation sources in the active workings. The approved ventilation system and methane and dust control plan required by § 75.316 of this title shall show the specific locations where designated area samples will be collected. Each designated area will be assigned a four digit identification number by MSHA.

(f) MSHA approval of the operator's ventilation system and methane and dust control plan may be revoked based on samples taken by MSHA or in accordance with this Part 70.

§ 70.209 Respirable dust samples; transmission by operator.

(a) The operator shall transmit within 24 hours after the end of the sampling shift all samples collected to fulfill the requirements of this part in containers provided by the manufacturer of the filter cassette to: Respirable Dust Processing Laboratory, Pittsburgh Technical Support Center, 4800-D Forbes Avenue, Pittsburgh, Pennsylvania 15213 or to any other address designated by the District Manager.

(b) The operator shall not open or tamper with the seal of any filter cassette or alter the weight of any filter cassette before or after it is used to fulfill the requirements of this part.

(c) A person certified in accordance with § 70.202 (Certified person; sampling) shall properly complete the dust data card that is provided by the manufacturer for each filter cassette. The card shall have an identification number identical to that on the cassette used to take the sample and be submitted to MSHA with the sample. Each card shall be signed by the certified person and shall include that person's certification number. Respirable dust samples with data cards not properly completed will be voided by MSHA.

(d) All respirable dust samples collected by the operator shall be considered taken to fulfill the sampling requirements of Parts 70, 71 or 90 of this title, unless the sample has been identified in writing by the operator to the District Manager, prior to the intended sampling shift, as a sample to be used for purposes other than required by Parts 70, 71 or 90 of this title.

(e) Respirable dust samples received by MSHA in excess of those required by this part shall be considered invalid samples.

OMB Control No. 1219-0011. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[45 FR 24006, Apr. 8, 1981, as amended at 47 FR 14696, Apr. 6, 1982]

§ 70.210 Respirable dust samples; report to operator; posting.

(a) The Secretary shall provide the operator with a report of the following data on respirable dust samples as soon as practicable:

(1) The mine identification number;

(2) The mechanized mining unit or designated area within the mine from which the samples were taken;

(3) The concentration of respirable dust, expressed in milligrams per cubic meter of air, for each valid sample;

(4) The average concentration of respirable dust, expressed in milligrams per cubic meter of air, for all valid samples;

(5) The occupation code, where applicable, and;

(6) The reason for voiding any samples.

(b) Upon receipt, the operator shall post this data for at least 31 days on the mine bulletin board.

§ 70.220 Status change reports.

(a) If there is a change in operational status that affects the respirable dust sampling requirements of this part, the operator shall report the change in operational status of the mine, mechanized mining unit, or designated area to the MSHA District Office or to any other MSHA office designated by the District Manager. Status changes shall be reported in writing within 3 working days after the status change has occurred.

(b) Each specific operational status is defined as follows: (1) Underground mine: (i) *Producing*—has at least one mechanized mining unit producing material.

(ii) *Nonproducing*—no material is being produced.

(iii) *Abandoned*—the work of all miners has been terminated and production activity has ceased.

(2) Mechanized mining unit:

(i) *Producing*—producing material from a working section.

(ii) *Nonproducing*—temporarily ceased production of material.

(iii) *Abandoned*—permanently ceased production of material.

(3) Designated Area:

(i) *Producing*—activity is occurring.

(ii) *Nonproducing*—activity has ceased.

(iii) *Abandoned*—the dust generating source has been withdrawn and activity has ceased.

Subpart D—Respiratory Equipment

AUTHORITY: Title II, secs. 303(b), and 508 of the Federal Coal Mine Health and Safety Act of 1969 (83 Stat. 742; 30 U.S.C. 801); secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803, unless otherwise noted.

SOURCE: 35 FR 5544, Apr. 3, 1970, unless otherwise noted.

§ 70.300 Respiratory equipment; respirable dust.

(a) Respiratory equipment approved by the Secretary and by the Secretary of Health and Human Services shall be made available to all persons whenever exposed to concentrations of respirable dust in excess of the levels required to be maintained under this Part 70. Use of respirators shall not be substituted for environmental control measures in the active workings. Each operator shall maintain a supply of respiratory equipment adequate to deal with occurrences of concentrations of respirable dust in the mine atmosphere in excess of the levels required to be maintained under this Part 70.

[35 FR 5544, Apr. 3, 1970, as amended at 47 FR 28095, June 29, 1982]

§ 70.300-1 Approved respiratory equipment; respirable dust.

(a) Filter-type respirators approved on and after January 19, 1965, under Part 14 of this chapter (Bureau of Mines Schedule 21B) and supplied-air respirators, Type G, approved on and after April 19, 1965, under Part 12 of this chapter (Bureau of Mines Schedule 19B) for protection against pneumoconiosis-producing dust, toxic dust, pneumoconiosis-producing mist, toxic mist, and toxic fumes are approved respiratory equipment for the purposes of § 70.300.

(b) Respirators approved during the period April 12, 1953, through January 18, 1965, under Part 14 of this chapter (Bureau of Mines Schedule 21A), and in use on or before June 30, 1970, for protection against pneumoconiosis-producing dust, toxic dust, pneumoconiosis-producing mist, toxic mist, and toxic fumes are approved respirators for the purposes of § 70.300 until December 31, 1970. Such respirators shall not be provided for protection under the provisions of § 70.300 on or after January 1, 1971.

§ 70.305 Respiratory equipment; gas, dusts, fumes, or mists.

Respiratory equipment approved by the Secretary and the Secretary of Health and Human Services shall be provided persons exposed for short periods to inhalation hazards from gas, dusts, fumes, or mist. When the exposure is for prolonged periods, other measures to protect such persons or to reduce the hazard shall be taken.

[35 FR 5544, Apr. 3, 1970, as amended at 47 FR 28095, June 29, 1982]

§ 70.305-1 Approved respiratory equipment; gas, dusts, fumes, or mists.

Respiratory equipment which has been approved by the Bureau of Mines or the Mine Safety and Health Administration under the parts of this chapter, on and after the dates listed in this section, are approved respiratory equipment for the purposes of § 70.305 but only with respect to the specific hazards referred to in the approved labels:

Part 13—Gas Masks (Bureau of Mines Schedule 14F) April 23, 1955;

Part 14—Filter-type, Dust, Fume, and Mist Respirators (Bureau of Mines Schedule 21B) January 10, 1965;

Part 14a—Non-Emergency Gas Respirators (Chemical Cartridge Respirators Including Paint Spray Respirators) (Bureau of Mines Schedule 23B) August 4, 1959.

Subpart E—Dust From Drilling Rock

AUTHORITY: Secs. 101 and 103(h) of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 and 1299 (30 U.S.C. 811 and 813(h)).

SOURCE: 45 FR 24004, Apr. 8, 1980, unless otherwise noted.

§ 70.400 Dust from drilling rock; control.

The dust resulting from drilling in rock shall be controlled by use of permissible dust collectors, or by water, or water with a wetting agent, or by ventilation, or by any other method or device approved by the Secretary which is as effective in controlling such dust.

§ 70.400-1 Dust from drilling rock; approved devices.

Dust collectors approved under Part 33 (Dust Collectors For Use In Connection With Rock Drilling In Coal Mines) of this title or under Bureau of Mine Schedule 25B are permissible dust collectors for the purpose of § 70.400 (Dust from drilling rock; control).

§ 70.400-2 Dust from drilling rock; water

Water used to control dust from drilling rock shall be applied through a hollow drill steel or stem or by the flooding of vertical drill holes in the floor.

§ 70.400-3 Dust from drilling rock; ventilation.

To adequately control dust from drilling rock, the air current shall be so directed that the dust is readily dispersed and carried away from the drill operator or any other workers in the area.

Subpart F—Noise Standard

§ 70.500 Definitions.

As used in this Subpart F, the term:

(a) "dBA" means noise level in decibels, relative to a reference level of 20 micro pascals, as measured by the use of an A-weighting and slow metering characteristic as specified in American National Standards Institute (ANSI), "Specification for Sound Level Meters," S1.4-1971 (Type S2A).

(b) "Noise exposure" means a period of time during which the noise level is 90 or more dBA;

(c) "Multiple noise exposure" means the daily noise exposure is composed of two or more different noise levels;

(d) "Noise level" is the average dBA during a noise exposure; and,

(e) "Qualified person" means, as the context requires, an individual deemed qualified by the Secretary and designated by the operator to make tests and examinations required by this Act.

(f) "Personal noise dosimeter" means equipment worn by an individual, which performs noise level measurements along with exposure time measurements. The circuitry of the instrument is such that it automatically performs the computation of the multiple noise exposure specified in § 70.502.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); sec. 301 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317 (U.S.C. 961))

[36 FR 12739, July 7, 1971, as amended at 43 FR 40761, Sept. 12, 1978; 44 FR 52827, Sept. 11, 1979]

§ 70.501 Requirements.

Every operator of an underground coal mine shall maintain the noise levels during each shift to which each miner in the active workings of the mine is exposed at or below the permissible noise levels set forth in Table I of this subpart.

EXAMPLE: If a noise is recorded to be 110 dBA then exposure shall not exceed 30 minutes during an 8-hour shift.

(Secs. 101 and 206, 83 Stat. 745 and 765; 30 U.S.C. 801 and 846)

[36 FR 12739, July 7, 1971]

§ 70.502 Computation of multiple noise exposure.

The standard will be considered to have been violated in the case of multiple noise exposure where such exposure totals exceed one as computed by adding the total time of exposure at each specified level (C_1, C_2, C_3etc.) divided by the total time of exposure permitted at that level (T_1, T_2, T_3). Thus, $[C_1/T_1]+[C_2/T_2]+[C_3/T_3]$ must not exceed 1.

EXAMPLE I: Exposure of 2 hours at 92 dBA and 1 hour at 100 dBA during an 8-hour shift.

Total minutes of noise exposure at dBA level/Total minutes of permissible noise exposure at dBA level [120 min./360 min.+60 min./120 min.] $= \frac{1}{3} + \frac{1}{2} = \frac{2}{6} + \frac{3}{6} = \frac{5}{6}$

The sum of the fractions does not exceed one; hence the exposure for the shift would not violate the standard.

EXAMPLE II: Exposure of 3 hours at 95 dBA and 1 hour at 100 dBA during an 8 hour shift.

$$\frac{3}{4} + \frac{1}{2} = \frac{3}{4} + \frac{2}{4} = \frac{5}{4}$$

The sum of the fractions exceeds one; hence the exposure for the shift would violate the standard.

(Secs. 101 and 206, 83 Stat. 745 and 765; 30 U.S.C. 801 and 846)

[36 FR 12739, July 7, 1971]

§ 70.503 Noise exposure measurements; general.

Every coal mine operator shall take accurate readings of the noise levels to which each miner in the active workings of the mine is exposed during the performance of the duties to which he is normally assigned.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); sec. 301 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961))

[36 FR 12739, July 7, 1971, as amended at 43 FR 40761, Sept 12, 1978; 44 FR 52827, Sept. 11, 1979]

§ 70.504 Noise exposure measurements; by whom done.

The noise exposure measurements required by this Subpart F shall be taken by, or as directed by, a person who has met the minimum requirements set forth in § 70.504-1, and has been certified by the Assistant Secretary of Labor for Mine Safety and Health, Mine Safety and Health Administration as qualified to take noise exposure measurements as prescribed in this Subpart F.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); sec. 301 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961))

[36 FR 12739, July 7, 1971, as amended at 43 FR 12319, Mar 24, 1978; 43 FR 40761, Sept. 12, 1978; 43 FR 43458, Sept. 26, 1978; 44 FR 52827, Sept. 11, 1979]

§ 70.504-1 Persons qualified to measure noise exposures; minimum requirements.

The following persons shall be considered qualified to take noise exposure measurements as prescribed in this Subpart F;

(a) Any person who has been certified by the Mine Safety and Health Administration as an instructor in noise measurement training programs;

(b) Any person who has satisfactorily completed a noise training course conducted by the Mine Safety and Health Administration and has been certified by the Administration as a qualified person; and,

(c) Any person who has satisfactorily completed a noise training course approved by the Mine Safety and Health Administration and has been certified by the Administration as a qualified person.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); sec. 301 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961))

[36 FR 12739, July 7, 1971, as amended at 43 FR 40761, Sept. 12, 1978; 44 FR 52827, Sept. 11, 1979]

§ 70.504-2 Certification of qualified persons by the Mine Safety and Health Administration.

Upon a satisfactory showing that a person has met the minimum requirements for taking noise exposure measurements set forth in § 70.504-1, the Mine Safety and Health Administration shall certify that such person has the ability and capacity to conduct tests of the noise exposure in a coal mine and to report and certify the results of such tests to the Secretary and the Secretary of Health and Human Services.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); sec. 301 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961))

[36 FR 12739, July 7, 1971, as amended at 43 FR 40761, Sept. 12, 1978; 44 FR 52827, Sept. 11, 1979; 47 FR 28095, June 29, 1982]

§ 70.505 Noise exposure measurement equipment.

Noise exposure measurements shall be taken only with equipment which is approved by the Mine Safety and Health Administration as permissible electric face equipment under the provisions of Part 18 of this chapter and which in the case of sound level meters, meets American National Standards Institute (ANSI), "Specification for Sound Level Meters," S1.4-1971 (Type S2A), or in the case of personal noise dosimeters, has been found to be acceptable by the Mine Safety and Health Administration.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); sec. 301 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961))

[43 FR 40761, Sept. 12, 1978; 44 FR 52827, Sept. 11, 1979]

§ 70.506 Noise exposure measurement procedures; instrument setting; calibration.

(a) Noise exposure measurements made with sound level meters shall conform to the following:

(1) Noise exposure measurements shall be made at locations where the noise it typical of that entering the ears of the miner whose exposure is under consideration.

(2) Five measurements shall be made for each type of noise exposure producing operation to which the miner under consideration is exposed.

(3) Each measurement shall be made by observing the A-scale readings for 30 seconds and recording the noise level.

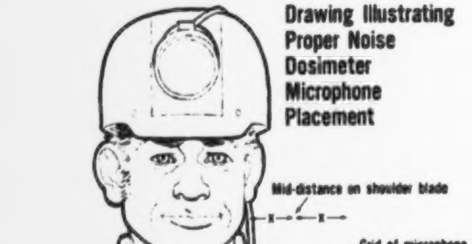
(4) The average of the five noise level measurements shall be considered as the noise level measurement which is representative of the operation.

(5) Where different and distinct noise levels occur at various phases of an operation, noise exposure measurements shall be made in accordance with this section for each distinct phase.

(6) The noise levels and the estimated length of time the miner is exposed to each level during a normal work shift shall be reported for the operation.

(b) Noise exposure measurements made with personal noise dosimeters shall conform to the following:

(1) For the miner whose noise exposure is under consideration, noise exposure measurements shall be made with the personal noise dosimeter microphone located at the top of the shoulder, midway between the neck and the end of the shoulder with the microphone pointing in a vertical upward direction in accordance with the diagram shown below:



Drawing Illustrating Proper Noise Dosimeter Microphone Placement

(2) To the extent practical, the personal noise dosimeter instrument case and microphone cable shall be positioned underneath exterior clothing so as to minimize potential safety problems and damage to the instrument. The microphone shall not be covered by clothing.

(3) The personal noise dosimeter shall be worn by the miner whose noise exposure is under consideration for an entire normal work shift and the accumulated per centum of the noise exposure shall be reported.

(c) Noise exposure measurement instruments specified in § 70.505 shall be set to operate with the A-weighted network and slow response.

(d)(1) Sound level meters and personal noise dosimeters used by an operator in fulfilling the requirements of this subpart shall be acoustically calibrated in accordance with the manufacturer's instructions before and after each shift on which the meter is used.

(2) Sound level meters and personal noise dosimeters used by an authorized representative of the Secretary shall be acoustically calibrated in accordance with the manufacturer's instructions or by another equivalent procedure before and after each shift on which the meter is used.

(3) Personal noise dosimeters shall be recalibrated annually, including, as a minimum, the following:

(i) Visual inspection of the microphone for any foreign matter or damage,

(ii) Comparison of the dosimeter, at 1000 Hz, with a laboratory type condensor microphone of known sensitivity, and

(iii) Frequency response testing in a free or diffused field where the sound field is established using a laboratory type condensor microphone of known sensitivity.

(4) A document containing the date of the annual recalibration of each personal noise dosimeter and the names of the individual and organization performing the calibration shall be kept on file at each mine office.

(e)(1) Acoustical calibrators which are used to calibrate sound level meters and personal noise dosimeters shall be recalibrated once a year using a laboratory type condensor microphone of known sensitivity as determined by a National Bureau of Standards calibration.

(2) A document containing the date of the annual calibration of each acoustical calibrator and the names of the indivdual and organization performing the calibration shall be on file at each mine office.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); sec. 301 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961))

[43 FR 40761, Sept. 12, 1978, as amended at 43 FR 50678, Oct. 31, 1978; 44 FR 52827, Sept. 11, 1979]

§ 70.507 Initial noise exposure survey.

On or before June 30, 1971, each operator shall:

(a) Conduct, in accordance with this subpart, a survey of the noise levels to which each miner in the active workings of the mine is exposed during his normal work shift; and,

(b) Report and certify to the Mine Safety and Health Administration, and the Department of Health and Human Services, the results of such survey using the Coal Mine Noise Data Report, Figure 1. Reports shall be sent to:

Division of Automatic Data Processing, Mine Safety and Health Administration, Building 53, Denver Federal Center, Colo. 80225.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); sec. 301 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961))

[36 FR 12739, July 7, 1971, as amended at 43 FR 40762, Sept. 12, 1978; 44 FR 52827, Sept. 11, 1979; 47 FR 28095, June 29, 1982]

§ 70.508 Periodic noise exposure survey.

(a) At intervals of at least every 6 months after June 30, 1971, but in no case shall the interval be less than 3 months, each operator shall conduct, in accordance with this subpart, periodic surveys of the noise levels to which each miner in the active workings of the mine is exposed and shall report and certify the results of such surveys to the Mine Safety and Health Administration, and the Department of Health and Human Services, using the Coal Mine Noise Data Report Form. Reports shall be sent to:

Division of Automatic Data Processing,
Mine Safety and Health Administration,
Building 53, Denver Federal Center, Colo.
80225.

(b) Where no A-scale reading recorded for any miner during an initial or periodic noise exposure survey exceeds 90 dBA, the operator shall not be required to survey such miner during any subsequent periodic noise level survey required by this section: *Provided, however,* That the name and job position of each such miner shall be reported in every periodic survey and the operator shall certify that such miner's job duties and noise exposure levels have not changed substantially during the preceding 6-month period.

OMB CONTROL No. 1219-0017 and 1219-0037. (47 FR 14696, Apr. 6, 1982)

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); sec. 301 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961), Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 12739, July 7, 1971, as amended at 43 FR 40762, Sept. 12, 1978; 44 FR 52827, Sept. 11, 1979; 47 FR 14696, Apr. 6, 1982; 47 FR 28095, June 29, 1982]

§ 70.509 Supplemental noise exposure survey; reports and certification.

(a) Where the certified results of an initial noise exposure survey conducted in accordance with § 70.507, or a periodic noise exposure survey conducted in accordance with § 70.508, show that any miner in the active workings of the mine is exposed to a noise level in excess of the permissible noise level prescribed in Table I, the operator shall conduct a supplemental noise exposure survey with respect to each miner whose noise exposure exceeds this standard. This survey shall be conducted within 15 days following notification to the operator by the Mine Safety and Health Administration to conduct such survey.

(b) Supplemental noise exposure surveys shall be conducted by taking noise exposure measurements in accordance with § 70.506, however, noise exposure measurements shall be taken during the entire period of each individual operation to which the miner under consideration is actually exposed during his normal work shift.

(c) Each operator shall report and certify the results of each supplemental noise level survey conducted in accordance with this section to the Mine Safety and Health Administration and the Department of Health and Human Services using the Coal Mine Noise Data Report Form to record noise level readings taken with respect to all operations during which such measurements were taken.

(d) Supplemental noise exposure surveys shall, upon completion, be mailed to:

Division of Automatic Data Processing,
Mine Safety and Health Administration,
Building 53, Denver Federal Center, Colo.
80225.

OMB CONTROL NOS. 1219-0017 and 1219-0037. (47 FR 14696, Apr. 6, 1982)

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); sec. 301 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961); Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 12739, July 7, 1971, as amended at 43 FR 40762, Sept. 12, 1978; 44 FR 52827, Sept. 11, 1979; 47 FR 14696, Apr. 6, 1982; 47 FR 28095, June 29, 1982]

§ 70.510 Violation of noise standard; notice of violation; action required by operator.

(a) Where the results of a supplemental noise exposure survey conducted in accordance with § 70.509 show that any miner in the active workings of the mine is exposed to noise levels which exceed the permissible noise levels prescribed in Table I, the Secretary shall issue a notice to the operator that he is in violation of this subpart.

(b) Upon receipt of a Notice of Violation issued pursuant to paragraph (a) of this section, the operator shall:

(1) Institute promptly administrative and/or engineering controls necessary to assure compliance with the standard. Such controls may include protective devices other than those devices or systems which the Secretary or his authorized representative finds to be hazardous in such mine.

(2) Within 60 days following the issuance of any Notice of Violation of this subpart, submit for approval to a joint Mine Safety and Health Administration-Health and Human Services committee, a plan for the administration of a continuing, effective hearing conservation program to assure compliance with this subpart, including provision for:

(i) Reducing environmental noise levels;

(ii) Personal ear protective devices to be made available to the miners;

(iii) Preemployment and periodic audiograms.

(3) Plans required under paragraph (b) (2) of this section shall be submitted to:

Administrator, Coal Mine Health and Safety, Mine Safety and Health Administration, Department of Labor, 4015 Wilson Boulevard, Arlington, Va. 22203.

TABLE I—PERMISSIBLE NOISE EXPOSURES

Duration per day (hours)	Noise level (dBA)
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
¾	107
½	110
¼ or less	115

FIGURE 1—COAL MINE NOISE DATA REPORT

(Submit one form for each miner)

Date: ——— (month) ——— (day) ——— (year)

Company: ——————— Mine Name

———————————————

Mine I.D. number: ———————————

Section/Pit number: ———————————

Miners name: ———————————

Miners SSN: ———————————

Occupation code: ———————————

Initial ——— Periodic ——— Supplemental ———

Hearing protective device used:

Yes —— No —— If yes "R" value ———

Equipment in operation:

Manufacturer ———————————

Type ———————————

Model number ———————————

Serial or company number ——————

Dosimeter reading: ———————————

Measurement time (In minutes): —————

Operations (Loading, tramming, etc.)	Noise level dBA average	Minutes exposure

Signature of qualified person:

OMB CONTROL No. 1219-0017. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 12739, July 7, 1971, as amended at 43 FR 12319, Mar. 24, 1978; 43 FR 40762, Sept. 12, 1978; 44 FR 52827, Sept. 11, 1979; 47 FR 14696, Apr. 6, 1982; 47 FR 28095, June 29, 1982]

§ 70.511 Incorporation by reference.

In accordance with 5 U.S.C. 552(a)(1), the technical publication, "Specification for Sound Level Meters", S1.4-1971 (Type S2A), issued by the American National Standards Institute (ANSI), April 27, 1971, referenced in this Subpart F is hereby incorporated by reference and made a part hereof. The incorporated technical publication is available for examination at MSHA, 4015 Wilson Blvd., Arlington, Va. 22203; the National Institute for Occupational Safety and Health, 5600 Fishers Lane, Rockville, Md. 20857; each Coal Mine Health and Safety District and Subdistrict Office and the Federal Register library. In addition, copies of the document can be purchased from the American National Standards Institute (ANSI), 1430 Broadway, New York, N.Y. 10018.

(Sec. 101 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); sec. 301 of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 91 Stat. 1317 (30 U.S.C. 961))

[43 FR 40762, Sept. 12, 1978; 44 FR 52827, Sept. 11, 1979]

PART 71—MANDATORY HEALTH STANDARDS—SURFACE COAL MINES AND SURFACE WORK AREAS OF UNDERGROUND COAL MINES

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71.804 Supplemental noise exposure survey; reports and certification.
71.805 Violation of noise standard; notice of violation; action required by operator.

AUTHORITY: Sec. 101, 83 Stat. 745; 30 U.S.C. 811; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803, unless otherwise noted.

SOURCE: 37 FR 6368, Mar. 28, 1972, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12319, Mar. 24, 1978.

Subpart A—General

AUTHORITY: Secs. 101 and 103(h) of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 and 1299 (30 U.S.C. 811 and 813(h)).

SOURCE: 45 FR 80756, Dec. 5, 1980, unless otherwise noted.

§ 71.1 Scope.

This Part 71 sets forth mandatory health standards for each surface coal mine and for the surface work areas of each underground coal mine subject to the Federal Mine Safety and Health Act of 1977.

§ 71.2 Definitions.

For the purpose of this Part 71, the term:

(a) "Act" means the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173, as amended by Pub. L. 95-164.

(b) "Active workings" means any place in a surface coal mine or the surface work area of an underground coal mine where miners are normally required to work or travel.

(c) "Certified person" means an individual certified by the Secretary in accordance with § 71.202 (Certified person; sampling) to take respirable dust samples required by this part or certified in accordance with § 71.203 (Certified person; maintenance and calibration) to perform the maintenance and calibration of respirable dust sampling equipment as required by this part.

(d) "Concentration" means a measure of the amount of a substance contained per unit volume of air.

(e) "Designated work position" means a work position designated under § 71.208 (Bimonthly sampling; designated work positions).

(f) "District Manager" means the manager of the Coal Mine Safety and Health District in which the mine is located.

(g) "MRE instrument" means the gravimetric dust sampler with a four channel horizontal elutriator developed by the Mining Research Establishment of the National Coal Board, London, England.

(h) "MSHA" means the Mine Safety and Health Administration of the Department of Labor.

(i) "Normal work shift" means (1) a shift during which the regular duties of the designated work position are performed while routine day-to-day mining activities are occurring in the rest of the mine and (2) a shift during which there is no rain, or, if rain occurs, the rain does not suppress the respirable dust to the extent that sampling results will be measurably lower, in the judgment of the person certified under this part to conduct sampling.

(j) "Quartz" means crystalline silicon dioxide (SiO_2) not chemically combined with other substances and having a distinctive physical structure.

(k) "Respirable dust" means dust collected with a sampling device approved by the Secretary and the Secretary of Health and Human Services in accordance with Part 74 (Coal Mine Dust Personal Sampler Units) of this title. Sampling device approvals issued by the Secretary of the Interior and Secretary of Health, Education and Welfare are continued in effect.

(l) "Secretary" means the Secretary of Labor or a delegate.

(m) "Surface area" means a specific physical portion of a surface coal mine or surface area of an underground coal mine. These areas are assigned a four digit identification number by MSHA.

(n) "Surface coal mine" means a surface area of land and all structures, facilities, machinery, tools, equipment, excavations, and other property, real or personal, placed upon or above the surface of such land by any person, used in, or to be used in, or resulting from, the work of extracting in such area bituminous coal, lignite, or anthracite from its natural deposits in the earth by any means or method, and the work of preparing the coal so extracted, including custom coal preparation facilities.

(o) "Surface installation" means any structure in which miners work at a surface coal mine or surface work area of an underground coal mine.

(p) "Surface work area of an underground coal mine" means the surface areas of land and all structures, facilities, machinery, tools, equipment, shafts, slopes, excavations, and other property, real or personal, placed in, upon or above the surface of such land by any person, used in, or to be used in, or resulting from, the work of extracting bituminous coal, lignite, or anthracite from its natural deposits underground by any means or method, and the work of preparing the coal so extracted, including custom coal preparation facilities.

(q) "Surface worksite" means any area in which miners work at a surface coal mine or surface work area of an underground coal mine.

(r) "Valid respirable dust sample" means a respirable dust sample collected and submitted as required by this part, and not voided by MSHA.

(s) "Work position" means an occupation identified by an MSHA code number describing a location to which a miner is assigned in the performance of his or her normal duties.

Subpart B—Dust Standards

AUTHORITY: Secs. 101 and 103(h) of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 and 1299 (30 U.S.C. 811 and 813(h)).

SOURCE: 45 FR 80757, Dec. 5, 1980, unless otherwise noted.

§ 71.100 Respirable dust standard.

Each operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which each miner in the active workings is exposed at or below 2.0 milligrams of respirable dust per cubic meter of air. Concentrations shall be measured with an approved sampling device and expressed in terms of an equivalent concentration determined in accordance with § 71.206 (Approved sampling devices; equivalent concentrations).

§ 71.101 Respirable dust standard when quartz is present.

When the respirable dust in the mine atmosphere of the active workings contains more than 5 percent quartz, the operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which each miner is exposed at or below a concentration of respirable dust computed by dividing the percent of quartz into the number 10. Concentrations shall be expressed in milligrams per cubic meter of air as measured with an approved sampling device and in terms of an equivalent concentration determined in accordance with § 71.206 (Approved sampling devices; equivalent concentrations).

EXAMPLE: The respirable dust associated with a designated work position contains quartz in the amount of 20%. Therefore, the average concentration of respirable dust in the mine atmosphere associated with that designated work position shall be continuously maintained at or below 0.5 milligrams of respirable dust per cubic meter of air (10/20 = 0.5 mg/m^3).

Subpart C—Sampling Procedures

AUTHORITY: Secs. 101 and 103(h) of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173, as amended by Pub. L. 95-164, 91 Stat. 1291 and 1299 (30 U.S.C. 811 and 813(h)).

SOURCE: 45 FR 80757, Dec. 5, 1980, unless otherwise noted.

§ 71.201 Sampling; general requirements.

(a) Each operator shall take respirable dust samples of the concentration of respirable dust in the active workings of the mine as required by this part with a sampling device approved by the Secretary and the Secretary of Health and Human Services under Part 74 (Coal Mine Dust Personal Sampler Units) of this title.

(b) Sampling devices shall be worn or carried directly to and from the designated work position to be sampled and shall remain operational during the entire shift or for 8 hours, whichever time is less.

(c) Upon request from the District Manager, the operator shall submit the date on which collecting any respirable dust samples required by this part will begin.

(d) During the time for abatement fixed in a citation for violation of § 71.100 (Resipirable dust standard) or § 71.101 (Respirable dust standard when quartz is present), the operator shall take corrective action to lower the concentration of respirable dust to within the permissible concentration and then sample each normal work shift until five valid respirable dust samples are taken.

(e) Upon written request by the operator, the District Manager may waive the rain restriction for a normal work shift as defined in § 71.2 (Definitions) for a period not to exceed two months, if the District Manager determines that:

(1) The operator will not have reasonable opportunity to complete the respirable dust sampling required by this part without the waiver because of the frequency of rain; and

(2) The operator did not have reasonable opportunity to complete the respirable dust sampling required by this part prior to requesting the waiver.

§ 71.202 Certified person; sampling.

(a) The respirable dust sampling required by this part shall be done by a certified person.

(b) To be certified, a person shall pass the MSHA examination on sampling of respirable coal mine dust.

(c) A person may be temporarily certified by MSHA to take respirable dust samples if the person receives instruction from an authorized representative of the Secretary in the methods of collecting and submitting samples under this rule. The temporary certification shall be withdrawn if the person does not successfully complete the examination conducted by MSHA on sampling of respirable coal mine dust within six months from the issue date of the temporary certification.

§ 71.203 Certified person; maintenance and calibration.

(a) Approved sampling devices shall be maintained and calibrated by a certified person.

(b) To be certified, a person shall pass the MSHA examination on maintenance and calibration procedures for respirable dust sampling equipment.

(c) A person may be temporarily certified by MSHA to maintain and calibrate approved sampling devices if the person receives instruction from an authorized representative of the Secretary in the maintenance and calibration procedures for respirable dust sampling equipment under this rule. The temporary certification shall be withdrawn if the person does not successfully complete the exmamination conducted by MSHA on maintenance and calibration procedures within six months from the issue date of the temporary certification.

§ 71.204 Approved sampling devices; maintenance and calibration.

(a) Approved sampling devices shall be maintained as approved under Part 74 (Coal Mine Dust Personal Sampler Units) of this title and calibrated in accordance with MSHA Informational Report No. 1121, "Standard Calibration and Maintenance Procedures for Wet Test Meters and Coal Mine Respirable Dust Samplers (Supersedes IR 1073)," by a person certified in accordance with § 71.203 (Certified person; maintenance and calibration).

(b) Approved sampling devices shall be calibrated at the flowrate of 2.0 liters of air per minute, or at a different flowrate as prescribed by the Secretary and the Secretary of Health and Human Services for the particular device, before they are put into service and at intervals not to exceed 200 hours of operating time thereafter.

(c) A calibration mark shall be placed on the flowmeter of each approved sampling device to indicate the proper position of the float when the sampler is operating at a flowrate of 2.0 liters of air per minute or other flowrate prescribed by the Secretary and the Secretary of Health and Human Services for the particular device. The standard to denote proper flow is when the lowest part of the float is tangent to the top of the calibration mark.

(d) Approved sampling devices shall be tested and examined immediately before each sampling shift and necessary external maintenance shall be performed to assure that the sampling devices are clean and in proper working condition by a person certified in accordance with § 71.202 (Certified person; sampling) or § 71.203 (Certified person; maintenance and calibration). This testing and examination shall include the following:

(1) Testing the voltage of each battery while under actual load to assure the battery is fully charged. The voltage for nickel cadmium cell batteries shall not be lower than the product of the number of cells in the battery pack multiplied by 1.25. The voltage for other than nickel cadmium cell batteries shall not be lower than the product of the number of cells in the

battery pack multiplied by the manufacturer's nominal voltage per cell value;

(2) Examination of all components of the cyclone to assure that they are clean and free of dust and dirt;

(3) Examination of the inner surface of the cyclone on the approved sampling device to assure that it is free of scoring;

(4) Examination of the external tubing on the approved sampling device to assure that it is clean and free of leaks; and,

(5) Examination of the clamping and positioning of the cyclone body, vortex finder and cassette to assure that they are rigid, in alignment, and firmly in contact.

(e) In accordance with 5 U.S.C. 552(a), MSHA Informational Report No. 1121 referenced in paragraph (a) of this section is hereby incorporated by reference and made a part of this section as if it was set forth in full. The incorporated publication is available without charge at each Coal Mine Safety and Health District and Subdistrict Office of MSHA and is on file at the Office of the Federal Register Information Center. Any future amendments to MSHA Information Report No. 1121 will be announced in the FEDERAL REGISTER. This incorporation by reference was approved March 25, 1980, by the Director of the Office of the Federal Register.

§ 71.205 Approved sampling devices; operation; air flowrate.

(a) Sampling devices approved in accordance with Part 74 (Coal Mine Dust Personal Sampler Units) of this title shall be operated at the flowrate of 2.0 liters of air per minute, or at a different flowrate as prescribed by the Secretary and the Secretary of Health and Human Services for the particular device.

(b) Each approved sampling device shall be examined each shift by a person certified in accordance with § 71.202 (Certified person; sampling) during the second hour after being put into operation to assure that the sampling device is operating properly and at the proper flowrate. If the proper flowrate is not maintained, necessary adjustments shall be made by the certified person.

(c) Each sampling device shall be examined each shift by a person certified in accordance with § 71.202 (Certified person; sampling) during the last hour of operation to assure that the sampling device is operating properly and at the proper flowrate. If the proper flowrate is not maintained, the respirable dust sample shall be transmitted to MSHA with a notation by the certified person on the dust data card stating that the proper flowrate was not maintained.

§ 71.206 Approved sampling devices; equivalent concentrations.

The concentration of respirable dust shall be determined by dividing the weight of dust in milligrams collected on the filter of an approved sampling device by the volume of air in cubic meters passing through the filter and then converting that concentration to an equivalent concentration as measured with an MRE instrument. To convert a concentration of respirable dust as measured with an approved sampling device to an equivalent concentration of respirable dust as measured with an MRE instrument, the concentration of respirable dust measured with the approved sampling device shall be multiplied by the constant factor prescribed by the Secretary for the approved sampling device used, and the product shall be the equivalent concentration as measured with an MRE instrument.

§ 71.207 [Reserved]

§ 71.208 Bimonthly sampling; designated work positions.

(a) Each operator shall take one valid respirable dust sample from each designated work position during each bimonthly period beginning with the bimonthly period of February 1, 1981. The bimonthly periods are:

February 1-March 31
April 1-May 31
June 1-July 31
August 1-September 30
October 1-November 30
December 1-January 31

(b) When the respirable dust standard is changed in accordance with §71.101 (Respirable dust standard when quartz is present), respirable dust sampling of designated work positions shall begin on the first normal work shift during the next bimonthly period following notification of such change from MSHA.

(c) Upon notification from MSHA that any respirable dust sample taken from a designated work position to meet the requirements of paragraph (a) or (b) of this section exceeds the applicable standard in § 71.100 (Respirable dust standard) or § 71.101 (Respirable dust standard when quartz is present), the operator shall take five valid respirable dust samples from that designated work position within 15 calendar days. The operator shall begin such sampling on the first day on which there is a normal work shift following the day of receipt of notification.

(d) Upon issuance of a citation for a violation of § 71.100 (Respirable dust standard) or § 71.101 (Respirable dust standard when quartz is present) involving a designated work position, paragraphs (a), (b), and (c) of this section shall not apply to that designated work position until the violation is abated in accordance with § 71.201(d) (Sampling; general requirements).

(e) The District Manager shall designate the work positions at each surface coal mine and surface work area of an underground coal mine for respirable dust sampling under this section. The District Manager shall designate for sampling each work position at the mine where an average concentration of respirable dust exceeding 1.0 milligram per cubic meter of air has been measured by one or more samples. Where the respirable dust standard is below 1.0 milligram per cubic meter of air in accordance with § 71.101 (Respirable dust standard when quartz is present), the District Manager shall designate for sampling each work position where an average concentration of respirable dust exceeding the applicable standard has been measured by one or more samples.

(f) The District Manager shall withdraw the designation of a work position for sampling upon finding that the operator is able to maintain continuing compliance with the applicable respirable dust standard under § 71.100 (Respirable dust standard) or § 71.101 (Respirable dust standard when quartz is present). This finding shall be based on the results of samples taken during at least a one-year period under this part and by MSHA.

(g) Unless otherwise directed by the District Manager, designated work position samples shall be taken by placing the sampling device as follows:

(1) Equipment operator. On the equipment operator or on the equipment within 36 inches of the operator's normal working position;

(2) Non-equipment operators. On the miner assigned to the designated work position or at a location that represents the maximum concentration of dust to which the miner is exposed.

(h) Each designated work position sample shall be taken on a normal work shift. If a normal work shift is not achieved, the respirable dust sample shall be transmitted to MSHA with a notation by the person certified in accordance with § 71.202 (Certified person; sampling) that the sample was not taken on a normal work shift. When a normal work shift is not achieved, the sample for that shift may be voided by MSHA. However, any sample, regardless of whether a normal work shift was achieved, with a respirable dust concentration greater than 2.5 milligrams per cubic meter of air will be used to determine the average concentration for that designated work position.

§ 71.209 Respirable dust samples; transmission by operator.

(a) The operator shall transmit within 24 hours after the end of the sampling shift all samples collected to fulfill the requirements of this part in containers provided by the manufacturer of the filter cassette to:

Respirable Dust Processing Laboratory
Pittsburgh Technical Support Center
4800-D Forbes Avenue
Pittsburgh, Pennsylvania 15213

or to any other address designated by the District Manager.

(b) The operator shall not open or tamper with the seal of any filter cassette or alter the weight of any filter cassette before or after it is used to fulfill the requirements of this part.

(c) A person certified in accordance with § 71.202 (Certified person; sampling) shall properly complete the dust data card that is provided by the manufacturer for each filter cassette. The card shall have an identification number identical to that on the cassette used to take the sample and be submitted to MSHA with the sample. Each card shall be signed by the certified person and shall include that person's certification number. Respirable dust samples with data cards not properly completed will be voided by MSHA.

(d) All respirable dust samples collected by the operator shall be considered taken to fulfill the sampling requirements of Part 70, 71 or 90 of this title, unless the sample has been identified in writing by the operator to the District Manager, prior to the intended sampling shift, as a sample to be used for purposes other than required by Part 70, 71 or 90 of this title.

(e) Respirable dust samples received by MSHA in excess of those required by this part shall be considered invalid samples.

OMB CONTROL No. 1219-0011. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[45 FR 80756, Dec. 5, 1980, as amended at 47 FR 14696, Apr. 6, 1982]

§ 71.210 Respirable dust samples; report to operator; posting.

(a) The Secretary shall provide the operator with a report of the following data on respirable dust samples as soon as practicable:

(1) The mine identification number;

(2) The designated work position at the mine from which the samples were taken;

(3) The concentration of respirable dust, expressed in milligrams per cubic meter of air, for each valid sample;

(4) The average concentration of respirable dust, expressed in milligrams per cubic meter of air, for all valid samples; and

(5) The reason for voiding any samples.

(b) Upon receipt, the operator shall post this data for at least 31 days on the mine bulletin board.

§ 71.220 Status change reports.

(a) If there is a change in operational status that affects the respirable dust sampling requirements of this part, the operator shall report the change in operational status of the mine or designated work position to the MSHA District Office or to any other MSHA office designated by the District Manager. Status changes shall be reported in writing within 3 working days after the status change has occurred.

(b) Each specific operational status is defined as follows: (1) Underground mine: (i) Producing—has at least one mechanized mining unit producing material.

(ii) Nonproducing—no material is being produced.

(iii) Abandoned—the work of all miners has been terminated and production activity has ceased.

(2) Surface mine:

(i) Producing—normal activity is occurring and coal is being produced or processed or other material or equipment is being handled or moved.

(ii) Nonproducing—normal activity is not occurring and coal is not being produced or processed or other material or equipment is not being handled or moved.

(iii) Abandoned—the work of all miners has been terminated and all activity has ceased.

(3) Designated work position:

(i) Producing—normal activity is occurring.

(ii) Nonproducing—normal activity is not occurring.

(iii) Abandoned—the dust generating source has been withdrawn and activity has ceased.

Subpart D—Respirable Dust Control Plans

AUTHORITY: Secs. 101 and 103(h) of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 and 1299 (30 U.S.C. 811 and 813(h)).

SOURCE: 45 FR 80759, Dec. 5, 1980, unless otherwise noted.

§ 71.300 Respirable dust control plan; filing requirements.

(a) Within 15 calendar days after the termination date of a citation for violation of § 71.100 (Respirable dust standard) or § 71.101 (Respirable dust standard when quartz is present), the operator shall submit to the District Manager for approval a written respirable dust control plan applicable to the work position identified in the citation. The respirable dust control plan and revisions thereof shall be suitable to the conditions and the mining system of the coal mine and shall be adequate to continuously maintain respirable dust within the permissible concentration at the surface work position identified in the citation.

(b) Each respirable dust control plan shall include at least the following:

(1) The mine identification number and designated work position number assigned by MSHA, the operator's name, mine name, mine address, and mine telephone number and the name, address, and telephone number of the principal officer in charge of health and safety at the mine;

(2) The specific designated work position at the mine to which the plan applies;

(3) A detailed description of the specific respirable dust control measures used to abate the violation of the respirable dust standard; and

(4) A detailed description of how each of the respirable dust control measures described in response to paragraph (b)(3) of this section will continue to be used by the operator, including at least the specific time, place and manner the control measures will be used.

§ 71.301 Respirable dust control plan; approval by District Manager and posting.

(a) The District Manager will approve respirable dust control plans on a mine-by-mine basis. When approving respirable dust control plans, the District Manager shall consider whether:

(1) The respirable dust control measures would be likely to maintain compliance with the respirable dust standard; and

(2) The operator's compliance with all provisions of the respirable dust control plan could be objectively ascertained by MSHA.

(b) MSHA may take respirable dust samples to determine whether the respirable dust control measures in the operator's plan effectively maintain compliance with the respirable dust standard.

(c) The operator shall comply with all provisions of each respirable dust control plan upon notice from MSHA that the respirable dust control plan is approved.

(d) The operator shall post on the mine bulletin board a copy of each current respirable dust control plan approved by the District Manager.

(e) The operator may review respirable dust control plans and submit proposed revisions to such plans to the District Manager for approval.

Subpart E—Surface Bathing Facilities, Change Rooms, and Sanitary Flush Toilet Facilities at Surface Coal Mines

§ 71.400 Bathing facilities; change rooms; sanitary flush toilet facilities.

Each operator of a surface coal mine shall provide bathing facilities, clothing change rooms, and sanitary flush toilet facilities, as hereinafter prescribed, for the use of miners employed in the surface installations and at the surface worksites of such mine. (NOTE: Sanitary facilities at surface work areas of underground mines are subject to the provisions of § 75.1712 of this chapter et seq.)

§ 71.401 Location of facilities.

Bathhouses, change rooms, and sanitary flush toilet facilities shall be in a location convenient for the use of the miners. Where these facilities are designed to serve more than one mine, they shall be centrally located so as to be convenient for the use of all miners served by the facilities.

§ 71.402 Minimum requirements for bathing facilities, change rooms, and sanitary flush toilet facilities.

(a) All bathing facilities, change rooms, and sanitary flush toilet facilities shall be provided with adequate light, heat, and ventilation so as to maintain a comfortable air temperature and to minimize the accumulation of moisture and odors, and the facilities shall be maintained in a clean and sanitary condition.

(b) Bathing facilities, change rooms, and sanitary flush toilet facilities shall be constructed and equipped so as to comply with applicable State and local building codes. *However,* Where no State or local building codes apply to these facilities, or where no State or local building codes exist, the facilities shall be constructed and equipped so as to meet the minimum construction requirements in the National Building Code (1967 edition) and the plumbing requirements in the National Plumbing Code (ASA A40.8—1955) which documents are hereby incorporated by reference and made a part hereof. These documents are available for examination at the Mine Safety and Health Administration, Department of Labor, 4015 Wilson Boulevard, Arlington, Va. 22203; at every Coal Mine Health and Safety District and Subdistrict Office; at the National Institute for Occupational Safety and Health, 5600 Fishers Lane, Rockville, Md.; and at the Public Health Service Information Centers as listed in 45 CFR 5.31. Copies of the National Building Code (1967 edition) may be purchased from the American Insurance Association, 85 John Street, New York, NY 10038, for $2.50 per copy and copies of the National Plumbing Code (ASA A40.8—1955) may be purchased from the American National Standards Institute, Inc., 1430 Broadway, New York, N.Y. 10018, for $6 per copy. An official historic file of the National Building Code (1967 edition) and of the National Plumbing Code (ASA A40.8—1955) will be maintained at the National Institute for Occupational Safety and Health, 5600 Fishers Lane, Rockville, Md.

(c) In addition to the minimum requirements specified in paragraphs (a) and (b) of this § 71.402, facilities maintained in accordance with § 71.400 shall include the following:

(1) *Bathing facilities.* (i) Showers shall be provided with both hot and cold water.

(ii) At least one shower head shall be provided where five or less miners use such showers.

(iii) Where five or more miners use such showers, sufficient showers shall be furnished to provide approximately one shower head for each five miners.

(iv) A suitable nonirritating cleansing agent shall be provided for use at each shower.

(2) *Sanitary flush toilet facilities.* (i) At least one sanitary flush toilet shall be provided where 10 or less miners use such toilet facilities.

(ii) Where 10 or more miners use such toilet facilities, sufficient flush toilets shall be furnished to provide approximately one sanitary flush toilet for each 10 miners.

(iii) Where 30 or more miners use toilet facilities, one urinal may be substituted for one flush toilet, however, where such substitutions are made they shall not reduce the number of toilets below a ratio of two flush toilets to one urinal.

(iv) An adequate supply of toilet paper shall be provided with each toilet.

(v) Adequate handwashing facilities or hand lavatories shall be provided in or adjacent to each toilet facility.

(3) *Change rooms.* (i) Individual clothes storage containers or lockers shall be provided for storage of miners' clothing and other incidental personal belongings during and between shifts.

(ii) Change rooms shall be provided with sample space to permit the use of such facilities by all miners changing clothes prior to and after each shift.

[37 FR 6368, Mar. 28, 1972, as amended at 43 FR 12319, Mar. 24, 1978]

§ 71.403 Waiver of surface facilities requirements; posting of waiver.

(a) The Coal Mine Health and Safety District Manager for the district in which the mine is located, after consultation with the appropriate Regional Program Director, National Institute for Occupational

Safety and Health, may, upon written application by the operator, and after consideration of any comments filed within 30 days after receipt of the application, waive any or all of the requirements for §§ 71.400 through 71.402 for a period not to exceed 1 year if he determines that—

(1) The operator is providing or making available, under arrangements with one or more third parties, facilities which are at least equivalent to those required by the standards, or

(2) It is impractical for the operator to meet the requirement(s) or provide the facility (facilities) for which the waiver is sought.

(b) The waiver shall be in writing and shall set forth the requirement(s) which the operator will not be required to meet or the facilities which the operator will not be required to provide and the specific reason or reasons for such waiver.

(c) Upon receipt of any waiver, the operator shall post a copy of the waiver for at least 30 days on the mine bulletin board required by section 107(a) of the Act.

(d) An extension of the waiver at the end of 1 year may be sought by the operator by filing an application pursuant to § 71.404 no later than 30 days nor more than 60 days prior to the expiration date of the waiver.

OMB CONTROL No. 1219-0024, paragraph 71.403(d). (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[37 FR 6368, Mar. 28, 1972, as amended at 47 FR 14696, Apr. 6, 1982]

§ 71.404 Application for waiver of surface facilities requirements.

(a) Application for waivers of any requirements of §§ 71.400 through 71.402 shall be in writing, filed with the appropriate Coal Mine Health and Safety District Manager, and shall contain the following information:

(1) The name and address of the mine operator,

(2) The name and location of the mine, and

(3) A detailed statement of the grounds upon which the waiver is requested and the period of time for which it is requested.

(b) At the same time the application is sent to the District Manager, a copy of the application shall be forwarded to the appropriate Regional Program Director, National Institute for Occupational Safety and Health by the operator, and a copy showing the addresses of the appropriate District Manager and Regional Program Director shall be posted by the operator for at least 30 days on the mine bulletin board required by section 107(a) of the Act.

Subpart F—Sanitary Toilet Facilities at Surface Worksites of Surface Coal Mines

§ 71.500 Sanitary toilet facilities at surface worksites; approved sanitary toilets; installation requirements.

(a) Each operator of a surface coal mine shall provide and install at least one approved sanitary toilet, together with an adequate supply of toilet tissue, in a location convenient to each surface work site. A single approved sanitary toilet may serve two or more surface worksites in the same surface mine where the sanitary toilet is convenient to each such worksite. Where 10 or more miners use such toilet facilities, sufficient toilets shall be furnished to provide approximately one sanitary toilet for each 10 miners. (NOTE: Sanitary toilet facilities for surface work areas of underground mines are subject to the provisions of § 75.1712-3 of this chapter.)

(b) Only sanitary toilets approved by the Health Division, Coal Mine Health and Safety, Mine Safety and Health Administration, jointly with the National Institute for Occupational Safety and Health shall meet the requirements of this section.

(c) Applications for approval of sanitary toilets shall be submitted to: Health Division, Coal Mine Health and Safety, Mine Safety and Health Administration, Department of Labor, 4015 Wilson Boulevard, Arlington, Va. 22203.

OMB CONTROL No. 1219-8018. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[37 FR 6368, Mar. 28, 1972, as amended at 43 FR 12319, Mar. 24, 1978; 47 FR 14696, Apr. 6, 1982]

§ 71.501 Sanitary toilet facilities; maintenance.

Sanitary toilets provided in accordance with the provisions of § 71.500 shall be regularly maintained in a clean and sanitary condition. Holding tanks shall be serviced and cleaned when full and in no case less than once each week when in use by draining or pumping or by removing them for cleaning and recharging. Transfer tanks and transfer equipment, if used, shall be equipped with suitable fittings to permit complete draining without spillage and allow for the sanitary transportation of wastes. Waste shall be disposed of in accordance with State and local laws and regulations.

Subpart G—Drinking Water

§ 71.600 Drinking water; general.

An adequate supply of potable water shall be provided for drinking purposes in each surface installation and at each surface worksite of the mine.

§ 71.601 Drinking water; quality.

(a) Potable water provided in accordance with the provisions of § 71.600 shall meet the applicable minimum health requirements for drinking water established by the State or community in which the mine is located.

(b) Where no such requirements are applicable, the drinking water provided shall conform to the Public Health Service Drinking Water Standards, 42 CFR Part 72, Subpart J.

§ 71.602 Drinking water; distribution.

(a) Water shall be piped or transported in sanitary containers. Water systems and appurtenances thereto shall be constructed and maintained in accordance with State and local requirements. Where no such requirements are applicable, water systems and appurtenances shall be constructed and maintained in accordance with the National Plumbing Code (ASA A40.8—1955) which is hereby incorporated by reference and made a part hereof. (For information as to the availability of this code, see § 71.402(b).)

(b) Water transported to the site shall be carried, stored and otherwise protected in sanitary containers constructed of smooth, impervious, heavy gauge, corrosion resistant materials. The containers shall be marked with the words "Drinking Water."

§ 71.603 Drinking water; dispensing requirements.

(a) Water shall be dispensed through a drinking fountain or from a water storage container with an adequate supply of single service cups stored in a clean, sanitary manner. Water shall not be dipped from inside water storage containers. Use of a common drinking cup is prohibited.

(b) Water containers shall remain sealed at all times during use and shall not be refilled with water for reuse without first being cleaned and disinfected with the use of heat or sanitizers.

(c) Drinking fountains from which water is dispensed shall be thoroughly cleaned once each week.

(d) Ice used for cooling drinking water shall not be immersed or in direct contact with the water to be cooled, unless it has been handled in a sanitary manner and unless the ice is made from the same source as the drinking water or from water of a quality equal to the source of the drinking water.

Subpart H—Airborne Contaminants

§ 71.700 Inhalation hazards; threshold limit values for gases, dust, fumes, mists, and vapors.

(a) No operator of an underground coal mine and no operator of a surface coal mine may permit any person working at a surface installation or surface worksite to be exposed to airborne contaminants (other than respirable coal mine dust, respirable dust containing quartz, and asbestos dust) in excess of, on the basis of a time-weighted average, the threshold limit values adopted by the American Conference of Governmental Industrial Hygienists in "Threshold Limit Values of Airborne Contaminants" (1972) which is hereby incorporated by reference and made a part hereof. Excursions above the listed threshold limit values shall not be of greater magnitude than is characterized as permissible by the conference. This paragraph does not apply to airborne contaminants given a "C" designation by the conference in the document. This document is available for examination at the Mine Safety and Health Administration, Department of Labor, 4015 Wilson Boulevard, Arlington, Va. 22203; at every Coal Mine Health and Safety District and Subdistrict Office; at the National Institute for Occupational Safety and Health, 5600 Fishers Lane, Rockville, MD; and at the Public Health Service Information Centers listed in 45 CFR 5.31. Copies of the document may be purchased from the Secretary-Treasurer, American Conference of Governmental Industrial Hygienists, Post Office Box 1937, Cincinnati, OH 45202.

(b) All persons, including employees, shall be withdrawn from any area in which there is a concentration of an airborne contaminant given a "C" designation by the Conference which exceeds the threshold limit value (ceiling "C" limit) listed for that contaminant.

[37 FR 6368, Mar. 28, 1972, as amended at 39 FR 17101, May 13, 1974; 43 FR 12319, Mar. 24, 1978. Redesignated at 45 FR 80756, Dec. 5, 1980]

§ 71.701 Sampling; general requirements.

(a) Air samples will be taken by the Secretary and will be analyzed to determine the concentrations of noxious or poisonous gases, dusts, fumes, mists, and vapors in surface installations and at surface worksites.

(b) Upon written notification by the Secretary to the operator of an underground coal mine or of a surface coal mine, the operator shall conduct any additional air sampling tests and analyses as the Secretary may from time to time require in order to ensure compliance with the standards set forth in § 71.700 in each surface installation and at each surface worksite.

(c) Where concentrations of airborne contaminants in excess of the applicable threshold limit values and permissible excursions are known by the operator to exist in a surface installation or at a surface worksite, he shall immediately provide necessary control measures to assure compliance with § 71.700.

(d) Where the operator has reasonable grounds to believe that concentrations of airborne contaminants in excess of the applicable threshold limit values and permissible excursions exist, or are likely to exist, he shall promptly conduct appropriate air sampling tests to determine the concentration of any airborne contaminant which may be present and immediately provide the necessary control measures to assure compliance with § 71.700.

[37 FR 6368, Mar. 28, 1972. Redesignated at 45 FR 80756, Dec. 5, 1980]

§ 71.702 Asbestos dust standard; measurement.

(a) The 8-hour average airborne concentration of asbestos dust to which miners are exposed shall not exceed two fibers per cubic centimeter of air. Exposure to a concentration greater than two fibers per cubic centimeter of air, but not to exceed 10 fibers per cubic centimeter of air, may be permitted for a total of 1 hour each 8-hour day. As used in this subpart, the term asbestos means chrysotile, amosite, crocidolite, anthophylite asbestos, tremolite asbestos, and actinolite asbestos but does not include nonfibrous or nonasbestiform minerals.

(b) The determination of fiber concentration shall be made by counting all fibers longer than 5 micrometers in length and with a length-to-width ratio of at least 3 to 1 in at least 20 randomly selected fields using phase contrast microscopy at 400–450 magnification.

[41 FR 10223, Mar. 10, 1976. Redesignated at 45 FR 80756, Dec. 5, 1980]

Subpart I—Noise Standard

§ 71.800 Noise standard; general requirements.

Each operator of an underground coal mine and each operator of a surface coal mine shall, during each shift, maintain the noise level to which each miner in each surface installation and at each surface worksite is exposed at or below the maximum noise exposure level prescribed in Subpart F, Part 70 of this Subchapter O.

[37 FR 6368, Mar. 28, 1972. Redesignated at 45 FR 80756, Dec. 5, 1980]

§ 71.801 Measurement of noise levels.

Each operator shall measure the noise level to which each miner is exposed in each surface installation and at each surface worksite in the manner prescribed in Subpart F, Part 70, of this Subchapter O.

[37 FR 6368, Mar. 28, 1972. Redesignated at 45 FR 80756, Dec. 5, 1980]

§ 71.802 Initial noise exposure survey.

On or before November 13, 1974 each operator shall:

(a) Conduct, in accordance with this subpart, a survey of the noise levels to which each miner in each surface installation and at each surface worksite is exposed during his normal work shift; and,

(b) Report and certify to the Mine Safety and Health Administration and the Department of Health and Human Services, the results of such survey using the Coal Mine Noise Data Report. (See Figure 1, Part 70 of this subchapter.) Reports shall be sent to:

Division of Automatic Data Processing, Post Office Box 25407, Building 41, Denver Federal Center, Denver, CO 80225.

OMB CONTROL No. 1219-0017 and 1219-0037. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[39 FR 17102, May 13, 1974, as amended at 43 FR 40764, Sept. 12, 1978. Redesignated at 45 FR 80756, Dec. 5, 1980 and further amended at 47 FR 14696, Apr. 6, 1982; 47 FR 28095, June 29, 1982]

§ 71.803 Periodic noise exposure survey.

(a) At intervals of at least every 6 months, after November 13, 1974 each operator shall conduct periodic surveys of the noise levels to which each miner in each surface installation and at each surface worksite is exposed and shall report and certify the results of such surveys to the Mine Safety and Health Administration and the Department of Health and Human Services, using the Coal Mine Noise Data Report Form. The interval between each survey shall not be less than 3 months. Reports shall be sent to:

Division of Automatic Data Processing, Post Office Box 25407, Building 41, Denver Federal Center, Denver, CO 80225.

(b) Where no A-scale reading recorded for any miner during an initial or periodic noise exposure survey exceeds 90 dBa, the operator shall not be required to survey such miner during any subsequent periodic noise exposure survey required by this section: *Provided, however,* That the name and job position of each such miner shall be reported in every periodic survey and the operator shall certify that such miner's job duties and noise exposure levels have not changed substantially during the preceding 6-month period.

OMB CONTROL No. 1219-0017 and 1219-0037. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[39 FR 17102, May 13, 1974, as amended at 43 FR 40764, Sept. 12, 1978. Redesignated at 45 FR 80756, Dec. 5, 1980 and further amended at 47 FR 14696, Apr. 6, 1982; 47 FR 28095, June 29, 1982]

§ 71.804 Supplemental noise exposure survey; reports and certification.

(a) Where the certified results of an initial noise exposure survey conducted in accordance with § 71.802 or a periodic noise exposure survey conducted in accordance with § 71.803 indicate that any miner may be exposed to a noise exposure in excess of the permissible noise exposure, the operator shall conduct a supplemental noise exposure survey with respect to each miner whose noise exposure exceeds this standard. This survey shall be conducted within 15 days following notification to the operator by the Mine Safety and Health Administration to conduct such survey.

(b) Supplemental noise exposure surveys shall be conducted by taking noise exposure measurements in accordance with § 70.506 of this Subchapter O; however, noise exposure measurements shall be taken of each individual operation to which the miner under consideration is actually exposed during his normal work shift and the duration of each such exposure shall be recorded.

(c) Each operator shall report and certify the results of each supplemental noise exposure survey conducted in accordance with this section to the Mine Safety and Health Administration and the Department of Health and Human Services using the Coal Mine Noise Data Report Form to record noise level readings taken with respect to all operations during which such measurements were taken.

(d) Supplemental noise exposure surveys shall, upon completion, be mailed to:

Division of Automatic Data Processing, Post Office Box 25407, Building 41, Denver Federal Center, Denver, CO 80225.

OMB CONTROL No. 1219-0017 and 1219-0037. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[39 FR 17102, May 13, 1974, as amended at 43 FR 40764, Sept. 12, 1978. Redesignated at 45 FR 80756, Dec. 5, 1980 and further amended at 47 FR 14696, Apr. 6, 1982; 47 FR 28095, June 29, 1982]

§ 71.805 Violation of noise standard; notice of violation; action required by operator.

(a) Where the results of a supplemental noise exposure survey conducted in accordance with § 71.804 indicate that any miner is exposed to noise levels which exceed the permissible noise levels, the Secretary shall issue a notice to the operator that he is in violation of this subpart.

(b) Upon receipt of a notice of violation issued pursuant to paragraph (a) of this section, the operator shall:

(1) Institute, promptly, administrative and/or engineering controls necessary to assure compliance with the standard. Such controls may include protective devices other than those devices or systems which the Secretary or his authorized representative finds to be hazardous in such mine.

(2) Within 60 days following the issuance of the first notice of violation of this subpart, submit for approval to a joint Mine Safety and Health Administration/Health and Human Services committee, a plan for the administration of a continuing, effective hearing conservation program to assure compliance with this subpart, including provision for:

(i) Reducing environmental noise levels;

(ii) Personal ear protective devices to be made available to the miners;

(iii) Preplacement and periodic audiograms.

(iv) Those administrative and engineering controls that it has instituted to assure compliance with the standard.

(3) Plans required under paragraph (b)(2) of this section shall be submitted to:

Division of Automatic Data Processing, Post Office Box 25407, Building 41, Denver Federal Center, Denver, CO 80225.

(c) Within 30 days following the issuance of any subsequent notice of violation of this subpart, the operator shall submit in writing:

(i) A statement of the manner in which the plan is intended to prevent the violation or

(ii) A revision to its plan to prevent similar future violations.

OMB CONTROL No. 1219-0017 and 1219-0037. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[39 FR 17102, May 13, 1974, as amended at 43 FR 40764, Sept. 12, 1978. Redesignated at 45 FR 80756, Dec. 5, 1980 and further amended at 47 FR 14696, Apr. 6, 1982; 47 FR 28095, June 29, 1982]

PART 74—COAL MINE DUST PERSONAL SAMPLER UNITS

Sec.

74.1 Purpose.
74.2 Sampler unit.
74.3 Specifications of sampler unit.
74.4 Tests of coal mine dust personal sampler units.
74.5 Conduct of tests; demonstrations.
74.6 Applications.
74.7 Certificate of approval.
74.8 Approval labels.
74.9 Material required for record.
74.10 Changes after certification.
74.11 Withdrawal of certification.

AUTHORITY: Sec. 508 of the Federal Coal Mine Health and Safety Act of 1969 (83 Stat. 803), 30 U.S.C. 957; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L.

95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803.

SOURCE: 35 FR 4326, Mar. 11, 1970, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12319, Mar. 24, 1978.

§ 74.1 Purpose.

The regulations in this part set forth the requirements for approval of coal mine dust personal sampler units designed to determine the concentrations of respirable dust in coal mine atmospheres; procedures for applying for such approval; test procedures; and labeling.

§ 74.2 Sampler unit.

A coal mine dust personal sampler unit shall consist of (a) a pump unit, (b) a sampling head assembly, and (c) if rechargeable batteries are used in the pump unit, a battery charger.

§ 74.3 Specifications of sampler unit.

(a) *Pump unit*--(1) *Dimensions.* The overall dimensions of the pump unit, hose connections and valve or switch covers shall not exceed 8 inches in height, 6 inches in width and 4 inches in thickness.

(2) *Weight.* The pump unit shall not weigh more than 4 pounds.

(3) *Construction.* The case and all components of the pump unit shall be of sufficiently durable construction to endure the wear of use in a coal mine and shall be tight fitting, so as to minimize the amount of dust entering the pump case.

(4) *Exhaust.* The pump shall exhaust into the pump case, maintaining a slight positive pressure which will reduce the entry of dust into the pump case.

(5) *Switch.* The pump unit shall be equipped with an on-off switch or equivalent device on the outside of the pump case. This switch shall be protected against accidental operation during use and protected to keep dust from entering the mechanisms.

(6) *Flow rate adjustment.* Except as provided in the last sentence of this paragraph (a) (6), the pump unit shall be equipped with a suitable means of flow rate adjustment accessible from outside the case. To prevent accidental adjustment, the flow rate adjuster shall be recessed in the pump case and shall require the use of an adjusting tool. If the pump is capable of maintaining the flow rate consistency required in this part without adjustment, an external flow rate adjuster is not required.

(7) *Battery.* The power supply for the pump shall be a suitable battery located in the pump case or in a separate case which attaches to the pump case by a permissible electrical connection.

(8) *Pulsation.* (i) The irregularity in flow rate due to pulsation shall have a fundamental frequency of not less than 20 Hz.

(ii) On and after July 1, 1974 the quantity of respirable dust collected with a sampler unit shall be within ±5 percent of that collected with a sampling head assembly operated with nonpulsating flow.

NOTE: The test procedures for evaluating sampler units with respect to this specification will be provided on request by the National Institute for Occupational Safety and Health, 1014 Broadway, Cincinnati, Ohio 45202.

(iii) Certificates of approval issued for sampler units which fail to comply with the specification set forth in paragraph (a) (8) (ii) of this section when such specification becomes effective, shall be revoked.

(9) *Belt clips.* The pump unit shall be provided with a belt clip which will hold the pump securely on a coal miner's belt.

(10) *Recharging connection.* A suitable connection shall be provided so that the battery may be recharged without removing the battery from the pump case or from the battery case if a separate battery case is used.

(11) *Flow rate indicator.* A visual indicator of flow rate (e.g., a flowmeter) shall be provided either as an integral part of the pump unit or of the sampling head assembly. The flowrate indicator shall be calibrated within ±5 percent at 2, 1.8, and 1.6 liters per minute to indicate the rate of air passing through the accompanying sampling head assembly.

(12) *Flow rate range.* The pump shall be capable of operating in or over a range of from 1.5 to 2.5 liters per minute and shall be adjustable over this range.

(13) *Flow rate consistency.* The flow shall remain within ±0.1 liters per minute over an 8-hour period when the pump is operated at 2 liters per minute with a standard sampling head assembly. Not more than two readjustments of the flow rate to 2 liters per minute shall be required to maintain this accuracy.

(14) *Duration of operation.* The pump shall be capable of operating for not less than 8 hours at a flow rate of 2 liters per minute against a resistance of 4 inches of water measured at the inlet of the pump.

(b) *Sampling head assembly.* The sampling head assembly shall consist of a cyclone and a filter assembly as follows:

(1) *Cyclone.* The cyclone shall consist of a cyclone body with removable grit cap and a vortex finder and shall be constructed of nylon or a material equivalent in performance. The dimensions of the components, with the exception of the grit cap, shall be identical to those of a Door-Oliver 10 mm. cyclone body, part No. 28541/4A or 01B11476-01 and vortex finder, part No. 28541/4B.

(2) *Filter assembly.* The filter assembly shall meet the following requirements:

(i) *Filter.* The filter shall be a membrane filter type with a nominal pore size not over 5 microns. It shall be nonhydroscopic and shall not dissolve or decompose when emersed in ethyl or isopropyl alcohol. The strength and surface characteristics of the filter shall be such that dust deposited on its surface may be removed by ultrasonic methods without tearing the filter. The filter resistance shall not be more than 2 inches of water at an airflow rate of 2 liters per minute.

(ii) *Capsule.* The capsule enclosing the filter shall not permit sample air to leak around the filter. The capsule shall be made of nonhydroscopic material. Its weight, including the enclosed filter, shall not exceed 5 grams and it shall be preweighed by the manufacturer with a precision of ±0.1 milligrams. Impact to the capsule shall not dislodge any dust from the capsule, which might then be lost to the weight measurement.

(iii) *Cassette.* The cassette shall enclose the capsule so as to prevent contamination. The cassette must be easily removable without causing a loss or gain of capsule weight. Appropriate covers shall be provided to prevent contaminants from entering, or dust from leaving, the capsule when it is not in use.

(3) *Arrangement of components.* The connections between the cyclone vortex finder and the capsule and between the capsule and the ¼-inch (inside diameter) hose mentioned in paragraph (b) (5) of this section shall be mechanically firm and shall not leak at a rate of more than 0.1 liters per hour under a vacuum of 4 inches of water.

(4) *Clamping of components.* The clamping and positioning of the cyclone body, vortex finder, and cassette shall be rigid, remain in alignment, be firmly in contact and airtight. The cyclone-cassette assembly shall be attached firmly to a backing plate or other means of holding the sampling head in position. The cyclone shall be held in position so that the inlet opening of the cyclone is pointing perpendicular to, and away from, the backing plate.

(5) *Hose.* A 3-foot long, ¼-inch (inside diameter) hose shall be provided to form an airtight connection between the inlet of the sampler pump and the outlet of the filter assembly. A device, capable of sliding along the hose and attaching to the miner's outer garment shall be provided.

(c) *Battery charger*—(1) *Power supply.* The battery charger shall be operated from a 117 volt, 60 Hz power line.

(2) *Connection.* The battery charger shall be provided with a cord and polarized connector so that it may be connected to the charge socket on the pump or battery case.

(3) *Protection.* The battery charger shall be fused, shall have a grounded power plug, and shall not be susceptible to damage by being operated without a battery on charge.

(4) *Charge rates.* The battery charger shall be capable of operating at either a 16-hour or a 64-hour charge rate. The battery charger shall be capable of fully charging the battery in the pump unit in the stated times and shall not overcharge a discharged battery in 16 hours when operating at the 16-hour charge rate or in 88 hours when operating at the 64-hour charge rate.

[35 FR 4326, Mar. 11, 1970, as amended at 37 FR 26712, Dec. 15, 1972; 37 FR 28294, Dec. 22, 1972; 39 FR 3677, Jan. 29, 1974]

§ 74.4 Tests of coal mine dust personal sampler units.

(a) The National Institute for Occupational Safety and Health, Department of Health and Human Services, shall conduct tests to determine whether a coal mine dust personal sampler unit which is submitted for approval under these regulations meets the requirements set forth in § 74.3.

(b) The Mine Safety and Health Administration, Department of Labor (MSHA) will conduct tests, pursuant to § 18.68 of this chapter, to determine whether the pump unit of a coal mine dust personal sampler unit submitted for approval under these regulations is intrinsically safe.

[35 FR 4326, Mar. 11, 1970, as amended at 37 FR 26712, Dec. 15, 1972; 43 FR 12319, Mar. 24, 1978; 47 FR 28095, June 29, 1982]

§ 74.5 Conduct of tests; demonstrations.

Prior to the issuance of a certificate of approval, only personnel of MSHA and National Institute for Occupational Safety and Health, representatives of the applicant, and such other persons as may be mutually agreed upon may observe the tests conducted. The MSHA and the National Institute for Occupational Safety and Health shall hold as confidential, and shall not disclose, principles of patentable features prior to certification, nor shall MSHA or Institute disclose any details of the applicant's drawings or specifications or other related material. After the issuance of a certificate of approval, MSHA or the National Institute for Occupational Safety and Health may conduct such public demonstrations and tests of the approved coal mine dust personal sampler unit as MSHA or Institute deems appropriate. The conduct of all investigations, tests, and demonstrations shall be under the sole direction of the National Institute for Occupational Safety and Health and MSHA and any other persons shall be present only as observers.

[35 FR 4326, Mar. 11, 1970, as amended at 37 FR 26712, Dec. 15, 1972]

§ 74.6 Applications.

(a) Testing of a coal mine dust personal sampler unit will be undertaken by the National Institute for Occupational Safety and Health, and testing of the pump unit of such a sampler unit will be undertaken by MSHA, only pursuant to a written application in duplicate, each copy accompanied by complete scale drawings, specifications and description of materials. An application to MSHA must be accompanied by a check, bank draft, or money order in the amount of $105, payable to the U.S. Mine Safety and Health Administration, to cover the fee specified in § 18.7 of this chapter. The applications, together with the drawings and specifications and any other related documents shall be sent to National Institute for Occupational Safety and Health, Department of Health and Human Services, Box 4256, 944 Chestnut Ridge Road, Morgantown, WV 26505, and MSHA Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W. Va. 26059.

(b) Ten complete coal mine dust personal sampler units must be sent to the National Institute for Occupational Safety and Health in connection with an application. One pump unit must be sent to MSHA in connection with an application.

(c) Drawings and specifications shall be adequate in number and fully detailed to identify the design of the coal mine dust personal sampler unit or pump unit thereof and to disclose the dimensions and materials of all component parts.

(d) An application shall describe the way in which each lot of components will be sampled and tested to maintain their quality prior to assembly of each sampler unit. In order to ensure that the quality of the coal dust personal sampler unit will be maintained in production through adequate quality control procedures, the National Institute for Occupational Safety and Health and MSHA reserve the right to have their qualified personnel inspect each applicant's control-test equipment procedures, and records and to interview the employees who conduct the control tests. Two copies of the results of any tests made by the applicant on the coal mine dust personal sampler unit or the pump unit thereof shall accompany an application.

[35 FR 4326, Mar. 11, 1970, as amended at 37 FR 26712, Dec. 15, 1972; 43 FR 12319, Mar. 24, 1978; 47 FR 28095, June 29, 1982]

§ 74.7 Certificate of approval.

(a) Upon completion of the testing of a coal mine dust personal sampler unit or the pump unit thereof, the National Institute for Occupational Safety and Health or MSHA, as appropriate, shall issue to the applicant either a certificate of approval or a written notice of disapproval, as the case may require. The National Institute for Occupational Safety and Health shall not issue a certificate of approval for a coal mine dust personal sampler unit unless MSHA has issued a certificate of approval for the pump unit thereof. No informal notification of approval will be issued. If a certificate of approval is issued, no test data or detailed results of tests will accompany such approval. If a notice of disapproval is issued, it will be accompanied by details of the defects, resulting in disapproval, with a view to possible correction.

(b) A certificate of approval will be accompanied by a list of the drawings and specifications, covering the details of design and construction of the coal mine dust personal sampler unit or the pump unit thereof upon which the certificate of approval is based. The applicant shall keep exact duplicates of the drawings and specifications submitted to the National Institute for Occupational Safety and Health and to MSHA relating to the sampler unit or pump unit thereof which has received a certificate of approval. The approved drawings and specifications shall be adhered to exactly in the production of the certified sampler unit, including the pump unit thereof, for commercial purposes. In addition, the applicant shall observe such procedures for, and keep such records of, the control of component parts as either MSHA or Institute may in writing require as a condition of certification.

[35 FR 4326, Mar. 11, 1970, as amended at 37 FR 26712, Dec. 15, 1972]

§ 74.8 Approval labels.

(a) Certificates of approval will be accompanied by photographs of designs for the approval labels to be affixed to each coal mine dust personal sampler unit.

(b) The labels showing approval by the National Institute for Occupational Safety and Health and by MSHA shall contain such information as MSHA or Institute may require and shall be reproduced legibly on the outside of a sampler unit as directed by the appropriate bureau.

(c) The applicant shall submit full-scale designs or reproductions of approval labels and a sketch or description of the position of the labels on each unit.

(d) Use of the approval labels obligates the applicant to whom the certificates of approval were issued to maintain the quality of the complete coal mine dust personal sampler unit and to guarantee that the complete sampler unit is manufactured or assembled according to the drawings and specifications upon which the certificates of approval were based. Use of the approval labels is authorized only on sampler units which conform strictly with the drawings and specifications upon which the certificates of approval were based.

[35 FR 4326, Mar. 11, 1970, as amended at 37 FR 26712, Dec. 15, 1972]

§ 74.9 Material required for record.

(a) As part of the permanent record of the investigation, the National Institute for Occupational Safety and Health will retain a complete coal mine dust personal sampler unit, and MSHA will retain a pump unit, that has been tested and certified. Material not required for record purposes will be returned to the applicant at his request and at his expense on written shipping instructions to MSHA or Institute.

(b) As soon as a coal mine dust personal sampler unit is commercially available, the applicant shall deliver a complete unit free of charge to the National Institute for Occupational Safety and Health, Department of Health and Human Services, Box 4256, 944 Chestnut Ridge Road, Morgantown, WV 26505.

[35 FR 4326, Mar. 11, 1970, as amended at 37 FR 26712, Dec. 15, 1972; 47 FR 28095, June 29, 1982]

§ 74.10 Changes after certification.

(a) If the applicant desires to change any feature of a certified coal mine dust personal sampler unit, he shall first obtain the approval of the National Institute for Occupational Safety and Health pursuant to the following procedures:

(1) Application shall be made as for an original certificate of approval, requesting that the existing certification be extended to encompass the proposed change. The application shall be accompanied by drawings, specifications and related material, as in the case of an original application.

(2) The application and accompanying material will be examined by the National Institute for Occupational Safety and Health to determine whether testing of the modified sampler unit or components will be required. Testing will be necessary if there is a possibility that the modification may affect the performance of the sampler unit adversely. The National Institute for Occupational Safety and Health will inform the applicant whether such testing is required.

(3) If the proposed modification meets the pertinent requirements of these regulations, a formal extension of certification will be issued, accompanied by a list of new and revised drawings and specifications to be added to those already on file as the basis for the extension of certification.

(b) If a change is proposed in a pump unit of a certified coal dust personal sampler unit, the approval of MSHA with respect to intrinsic safety shall be obtained in accordance with the procedures set forth in paragraph (a) of this section.

[35 FR 4326, Mar. 11, 1970, as amended at 37 FR 26712, Dec. 15, 1972]

§ 74.11 Withdrawal of certification.

Any certificate of approval issued under the regulations in this part may be revoked for cause by the Institute or MSHA which issued the certificate.

[37 FR 26712, Dec. 15, 1972]

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AUTHORITY: Secs. 301(d) and 508 of the Federal Coal Mine Health and Safety Act of 1969, Pub. L. 91-173, 83 Stat. 747, 30 U.S.C. 812; secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803, unless otherwise noted.

SOURCE: 35 FR 17890, Nov. 20, 1970, unless otherwise noted.

NOTE: The provisions of this part marked [Statutory Provision] appear in Title III of the Federal Coal Mine Health and Safety Act of 1969.

NOTE: Nomenclature changes appear at 43 FR 12319, Mar. 24, 1978.

Subpart A—General

§ 75.1 Scope.

This Part 75 sets forth safety standards compliance with which is mandatory in each underground coal mine subject to the Federal Mine Safety and Health Act of 1977. Some standards also are applicable to surface operations. Regulations and criteria supplementary to these standards also are set forth in this part.

[35 FR 17890, Nov. 20, 1970, as amended at 43 FR 12319, Mar. 24, 1978]

§ 75.2 Definitions.

[STATUTORY PROVISIONS]

For the purpose of this Part 75, the term—

(a) "Certified" or "registered" as applied to any person means a person certified or registered by the State in which the coal mine is located to perform duties prescribed by this Part 75, except that in a State where no program of certification or registration is provided or where the program does not meet at least minimum Federal standards established by the Secretary, such certification or registration shall be by the Secretary;

(b) "Qualified person" means, as the context requires,

(1) An individual deemed qualified by the Secretary and designated by the operator to make tests and examinations required by this Part 75; and

(2) An individual deemed, in accordance with minimum requirements to be established by the Secretary, qualified by training, education, and experience, to perform electrical work, to maintain electrical equipment, and to conduct examinations and tests of all electrical equipment;

(c) "Permissible" as applied to—

(1) Equipment used in the operation of a coal mine, means equipment, other than permissible electric face equipment, to which an approval plate, label, or other device is attached as authorized by the Secretary and which meets specifications which are prescribed by the Secretary for the construction and maintenance of such equipment and are designed to assure that such equipment will not cause a mine explosion or a mine fire.

(2) Explosives, shot-firing units, or blasting devices used in such mine, means explosives, shot-firing units, or blasting devices which meet specifications which are prescribed by the Secretary, and

(3) The manner of use of equipment or explosives, shot-firing units, and blasting devices, means the manner of use prescribed by the Secretary;

(d) "Rock dust" means pulverized limestone, dolomite, gypsum, anhydrite, shale, adobe, or other inert material preferably light colored, 100 per centum of which will pass through a sieve having 20 meshes per linear inch and 70 per centum or more of which will pass through a sieve having 200 meshes per linear inch; the particles of which when wetted and dried will not cohere to form a cake which will not be dispersed into separate particles by a light blast of air; and which does not contain more than 5 per centum of combustible matter or more than a total of 4 per centum of free and combined silica (SiO_2),or, where the Secretary finds that such silica concentrations are not available, which does not contain more than 5 per centum of free and combined silica;

(e) "Anthracite" means coals with a volatile ratio equal to 0.12 or less;

(f) "Volatile ratio" means volatile matter content divided by the volatile matter plus the fixed carbon;

(g) (1) "Working face" means any place in a coal mine in which work of extracting coal from its natural deposit in the earth is performed during the mining cycle,

(2) "Working place" means the area of a coal mine inby the last open crosscut,

(3) "Working section" means all areas of the coal mine from the loading point of the section to and including the working faces,

(4) "Active workings" means any place in a coal mine where miners are normally required to work or travel;

(h) "Abandoned areas" means sections, panels, and other areas that are not ventilated and examined in the manner required for working places under Subpart D of this Part 75;

(i) "Permissible" as applied to electric face equipment means all electrically operated equipment taken into or used inby the last open crosscut of an entry or a room of any coal mine the electrical parts of which, including, but not limited to, associated electrical equipment, components, and accessories, are designed, constructed, and installed, in accordance with the specifications of the Secretary, to assure that such equipment will not cause a mine explosion or mine fire, and the other features of which are designed and constructed, in accordance with the specifications of the Secretary, to prevent, to the greatest extent possible, other accidents in the use of such equipment; and the regulations of the Secretary or the Director of the Bureau of Mines in effect on March 30, 1970, relating to the requirements for investigation, testing, approval, certification, and acceptance of such equipment as permissible shall continue in effect until modified or superseded by the Secretary, except that the Secretary shall provide procedures, including, where feasible, testing, approval, certification, and acceptance in the field by an authorized representative of the Secretary, to facilitate compliance by an operator with the requirements of § 75.500 within the periods prescribed therein;

(j) "Low voltage" means up to and including 660 volts; "medium voltage" means voltages from 661 to 1,000 volts; and "higher voltage" means more than 1,000 volts;

(k) "Respirable dust" means dust collected with a sampling device approved by the Secretary and the Secretary of Health and Human Services in accordance with Part 74 (Coal Mine Dust Personal Sampler Units) of this title. Sampling device approvals issued by the Secretary of the Interior and Secretary of Health, Education, and Welfare are continued in effect.

(l) "Coal mine" includes areas of adjoining mines connected underground;

(m) "Secretary" means the Secretary of Labor or his delegate; and

(n) "Act" means the Federal Mine Safety and Health Act of 1977.

(Sec. 101, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811))

[35 FR 17890, Nov. 20, 1970, as amended at 43 FR 12319, 12320, Mar. 24, 1978; 45 FR 24004, Apr. 8, 1980; 47 FR 28095, June 29, 1982]

Subpart B—Qualified and Certified Persons

§ 75.100 Certified person.

(a) The provisions of Subpart D—Ventilation of this Part 75 require that certain examinations and tests be made by a certified person. A certified person within the meaning of those provisions is a person who has been certified as a mine foreman (mine manager), an assistant mine foreman (section foreman), or a preshift examiner (mine examiner). A person who has been so certified is also a qualified person within the meaning of those provisions of Subpart D of this part which require that certain tests be made by a qualified person and within the meaning of § 75.1106.

(b) A person who is certified as a mine foreman, an assistant mine foreman, or a preshift examiner by the State in which the coal mine is located is, to the extent of the State's certification, a certified person within the meaning of the provisions of Subpart D of this part and § 75.1106 referred to in paragraph (a) of this section.

(c) (1) The Secretary may temporarily certify for periods of time not to exceed 6 months for each such temporary certification, persons in the categories of mine foreman, assistant mine foreman, and preshift examiner whenever the State in which such persons are presently employed in such categories does not provide for such certification with respect to the coal mines in which such persons are employed, if the operator of such a coal mine in which such persons are employed makes an application and satisfactory showing that each such person has had at least 2 years experience underground in a coal mine and has held the position of mine foreman, assistant mine foreman, or preshift examiner for a period of 6 months immediately preceding the filing of the application and is qualified to test for methane and for oxygen deficiency. Applications for temporary Secretarial certification should be submitted in writing to the Health and Safety Activity, Mine Safety and Health Administration, Certification and Qualification Center, P.O. Box 25367, Denver Federal Center, Denver, Colo. 80225.

(2) A person certified by the Secretary under this paragraph (c) will be a certified person, within the meaning of the provisions of Subpart D of this part and § 75.1106 referred to in paragraph (a) of this section, only with respect to the coal mine in which he is employed at the time the application for certification is filed.

[35 FR 17890, Nov. 20, 1970, as amended at 43 FR 12320, Mar. 24, 1978]

§ 75.150 Tests for methane and for oxygen deficiency; qualified person.

(a) The provisions of Subpart D—Ventilation of this part and § 75.1106 require that tests for methane and for oxygen deficiency be made by a qualified person. A person is a qualified person for this purpose if he is a certified person under § 75.100.

(b) Pending issuance of Federal standards, a person will be considered a qualified person for testing for methane and for oxygen deficiency:

(1) If he has been qualified for this purpose by the State in which the coal mine is located; or

(2) The Secretary may qualify persons for this purpose in a coal mine in which persons are not qualified for this purpose by the State upon an application and a satisfactory showing by the operator of the coal mine that each such person has been trained and designated by the operator to test for methane and oxygen deficiency and has made such tests for a period of 6 months immediately preceding the application. Applications for Secretarial qualification should be submitted to the Health and Safety Activity, Mine Safety and Health Administration, Certification and Qualification Center, P.O. Box 25367, Denver Federal Center, Denver, Colo. 80225.

[35 FR 17890, Nov. 20, 1970, as amended at 43 FR 12320, Mar. 24, 1978]

§ 75.151 Tests for methane; qualified person; additional requirement.

Notwithstanding the provisions of § 75.150, on and after January 1, 1971, no person shall be a qualified person for testing for methane unless he demonstrates to the satisfaction of an authorized representative of the Secretary that he is qualified to test for methane with a portable methane detector approved by the Bureau of Mines or the Mine Safety and Health Administration under Part 22 of this chapter (Bureau of Mines Schedule 8C).

§ 75.152 Tests of air flow; qualified person.

A person is a qualified person within the meaning of the provisions of Subpart D—Ventilation of this part requiring that tests of air flow be made by a qualified person only if he is a certified person under § 75.100 or a person trained and designated by a certified person to perform such tests.

§ 75.153 Electrical work; qualified person.

(a) Except as provided in paragraph (f) of this section, an individual is a qualified person within the meaning of §§ 75.511 and 75.512 to perform electrical work (other than work on energized surface high-voltage lines) if:

(1) He has been qualified as a coal mine electrician by a State that has a coal mine electrical qualification program approved by the Secretary; or,

(2) He has at least 1 year of experience in performing electrical work underground in a coal mine, in the surface work areas of an underground coal mine, in a surface coal mine, in a noncoal mine, in the mine equipment manufacturing industry, or in any other industry using or manufacturing similar equipment, and has satisfactorily completed a coal mine electrical training program approved by the Secretary; or,

(3) He has at least 1 year of experience, prior to the date of the application required by paragraph (c) of this section, in performing electrical work underground in a coal mine, in the surface work areas of an underground coal mine, in a surface coal mine, in a noncoal mine, in the mine equipment manufacturing industry, or in any other industry using or manufacturing similar equipment, and he attains a satisfactory grade on each of the series of five written tests approved by the Secretary and prescribed in paragraph (b) of this section.

(b) The series of five written tests approved by the Secretary shall include the following categories:

(1) Direct current theory and application;

(2) Alternating current theory and application;

(3) Electric equipment and circuits;

(4) Permissibility of electric equipment; and,

(5) Requirements of Subparts F through K of this Part 75.

(c) In order to take the series of five written tests approved by the Secretary, an individual shall apply to the District Manager and shall certify that he meets the requirements of paragraph (a)(3) of this section. The tests will be administered in the Coal

Mine Safety and Health Districts at regular intervals, or as demand requires.

(d) A score of at least 80 percent of each of the five written tests will be deemed to be a satisfactory grade. Recognition shall be given to practical experience in that 1 percentage point shall be added to an individual's score in each test for each additional year of experience beyond the 1 year minimum requirement specified in paragraph (a)(3) of this section; however, in no case shall an individual be given more than 5 percentage points for such practical experience.

(e) An individual may, within 30 days from the date on which he received notification from the Administration of his test scores, repeat those on which he received an unsatisfactory score. If further retesting is necessary after this initial repetition, a minimum of 30 days from the date of receipt of notification of the initial retest scores shall elapse prior to such further retesting.

(f) An individual who has, prior to November 1, 1972, been qualified to perform electrical work specified in §§ 75.511 and 75.512 (other than work on energized surface high-voltage lines) shall continue to be qualified until June 30, 1973. To remain qualified after June 30, 1973, such individual shall meet the requirements of either paragraph (a) (1), (2), or (3) of this section.

(g) An individual qualified in accordance with this section shall, in order to retain qualification, certify annually to the District Manager, that he has satisfactorily completed a coal mine electrical retraining program approved by the Secretary.

(Sec. 101(a), Federal Coal Mine Health and Safety Act of 1969; 30 U.S.C. 811(a); 83 Stat. 745)

[37 FR 22376, Oct. 19, 1972, as amended at 44 FR 9380, Feb. 13, 1979; 47 FR 23641, May 28, 1982]

§ 75.154 Repair of energized surface high voltage lines; qualified person.

An individual is a qualified person within the meaning of § 75.705 for the purpose of repairing energized surface high voltage lines only if he has had at least 2 years experience in electrical maintenance, and at least 2 years experience in the repair of energized high voltage surface lines located on poles or structures.

§ 75.155 Qualified hoisting engineer; qualifications.

(a) (1) A person is a qualified hoisting engineer within the provisions of Subpart O of this part, for the purpose of operating a steam-driven hoist in a coal mine, if he has at least 1 year experience as an engineer in a steam-driven hoisting plant and is qualified by the State in which the mine is located as a steam-hoisting engineer; or

(2) If a State has no program for qualifying persons as steam-hoisting engineers, the Secretary may temporarily qualify persons for this purpose for periods of time not to exceed 6 months for each temporary certification if the operator of the coal mine in which such persons are employed makes an application and a satisfactory showing that each such person has had 1 year experience in operating steam-driven hoists and has held the position of hoisting engineer for a period of 6 months immediately preceding the application.

(b) (1) A person is a qualified hoisting engineer within the provisions of Subpart O of this part, for the purpose of operating an electrically driven hoist in a coal mine, if he has at least 1 year experience operating a hoist plant in a mine or maintaining electric-hoist equipment in a mine and is qualified by the State in which the mine is located as an electric-hoisting engineer; or

(2) If a State has no program for qualifying persons as electric-hoisting engineers, the Secretary may temporarily qualify persons for this purpose for periods of time not to exceed 6 months for each temporary certification if the operator of the coal mine in which such persons are employed makes an application and a satisfactory showing that each such person has had 1 year experience in operating electric-driven hoists and has held the position of hoisting engineer for a period of 6 months immediately preceding the application.

(c) Applications for Secretarial qualification should be submitted to the Health and Safety Activity, Mine Safety and Health Administration, Certification and Qualification Center, P.O. Box 25367, Denver Federal Center, Denver, Colo. 80225.

[35 FR 17894, Nov. 20, 1970, as amended at 43 FR 12320, Mar. 24, 1978]

§ 75.159 Records of certified and qualified persons.

The operator of each coal mine shall maintain a list of all certified and qualified persons designated to perform duties under this Part 75.

OMB CONTROL No. 1219-0049. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.160 Training programs.

[STATUTORY PROVISION]

Every operator of a coal mine shall provide a program, approved by the Secretary, of training and retraining of both qualified and certified persons needed to carry out functions prescribed in the Act.

§ 75.160-1 Plans for training programs.

On or before December 31, 1970, each operator shall submit to the District Manager a program or plan setting forth what, when, how, and where he will train and retrain persons whose work assignments require that they be certified or qualified. Such program shall provide: (a) For certified persons, annual training courses in methane measurement and oxygen deficiency testing, roof and rib control, ventilation, first aid, principles of mine rescue, and the provisions of this Part 75, and (b) for qualified persons, annual courses in performance of the tasks which they perform as qualified persons.

[35 FR 17894, Nov. 20, 1970, as amended at 44 FR 9380, Feb. 13, 1979; 44 FR 52827, Sept. 11, 1979; 47 FR 23641, May 28, 1982]

Subpart C—Roof Support

§ 75.200 Roof control programs and plans.

[STATUTORY PROVISIONS]

Each operator shall undertake to carry out on a continuing basis a program to improve the roof control system of each coal mine and the means and measures to accomplish such system. The roof and ribs of all active underground roadways, travelways, and working places shall be supported or otherwise controlled adequately to protect persons from falls of the roof or ribs. A roof control plan and revisions thereof suitable to the roof conditions and mining system of each coal mine and approved by the Secretary shall be adopted and set out in printed form on or before May 29, 1970. The plan shall show the type of support and spacing approved by the Secretary. Such plan shall be reviewed periodically, at least every 6 months by the Secretary, taking into consideration any falls of roof or ribs or inadequacy of support of roof or ribs. No person shall proceed beyond the last permanent support unless adequate temporary support is provided or unless such temporary support is not required under the approved roof control plan and the absence of such support will not pose a hazard to the miners. A copy of the plan shall be furnished to the Secretary or his authorized representative and shall be available to the miners and their representatives.

OMB CONTROL No. 1219-0004. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.200-1 Roof control program requirements.

Each operator shall adopt an adequate program for improving roof control systems. This program shall include a roof control plan, provision for the training of miners, a history of all unintentional roof falls, and systematic evaluation of the effectiveness of the roof control system in use.

§ 75.200-2 Roof control plans.

Each operator shall adopt a roof control plan suitable to the roof conditions and the mining system for all underground roadways, travelways including escapeways, and working places of each mine.

OMB CONTROL No. 1219-0004. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982]

§ 75.200-3 Filing of roof control plans.

Roof control plans shall be filed with the District Manager of the Coal Mine Health and Safety District in which the mine is located.

OMB CONTROL No. 1219-0004. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982]

§ 75.200-4 Actions on roof control plans.

The appropriate District Manager shall notify the operator in writing of the approval of a proposed roof control plan. If revisions are required for approval, the changes required will be specified and the operator will be afforded an opportunity to discuss the revisions with the District Manager.

§ 75.200-5 General information required in roof control plans.

A roof control plan shall include the following information:

(a) Name and address of the company.

(b) Name and address of the mine.

(c) Names and addresses of the responsible officials.

(d) Area of the mine covered by the roof control plan.

(e) A columnar section of the mine strata which shall:

(1) Show the name and thickness of the coalbed mined and any persistent partings.

(2) Identify by type and show the thickness of each stratum (rock layer) up to and including the main roof over and for 10 feet under the coalbed.

(3) Show the maximum cover over the mining area covered included in the roof control plan.

(f) A description of the sequence of mining and installation of supports including temporary supports. The description shall include:

(1) Drawings on 8½-inch by 11-inch paper or on paper folded to this size, showing the location of all roof, face, and rib supports for each method of mining employed at the mines. The scale shall be specified and not less than 5 feet to the inch nor more than 20 feet to the inch. A legend explaining all the symbols used shall also be included on the drawings.

(2) A list of all roof support materials employed in the roof control system including, where applicable, the name of the manufacturer and its designation for the item. Prior approval shall be obtained before making any changes in the materials listed.

OMB CONTROL No. 1219-0004. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.200-6 Criteria for approval of roof control plans.

Sections 75.200-7 through 75.200-14 set out the criteria by which District Managers will be guided in approving roof control plans on a mine-by-mine basis. Additional measures may be required. Roof control plans which do not conform to these criteria may be approved providing the operator can satisfy the District Manager that the resultant roof conditions will provide no less than the same measure of protection to the miners.

§ 75.200-7 Criteria—Full roof bolting plan.

A full roof bolting plan is one in which roof bolts constitute the sole means of roof support at a face as part of the normal mining cycle.

(a) Roof bolt assemblies should meet the following specifications:

(1) All components of the roof bolt assembly should comply with the American National Standards Insti-

tute, "Specifications for Roof Bolting Materials in Coal Mines".

(2) Roof bolts that provide support by creating a beam of laminated strata should be of a length that assures adequate anchorage, but in no case should the length of the bolt be less than 30 inches.

(3) Roof bolts that provide support by suspending the immediate roof from a stronger overlying strata should be of a length that permits anchoring at least 12 inches in the stronger strata.

(4) Bearing plates used directly against the mine roof should be not less than 6 inches square or of equivalent area. In exceptional cases where the mine roof is firm and not susceptible to sloughing, bearing plates 5 inches square or of equivalent area may be used.

(5) When wooden material such as planks, header blocks, and crossbars are used between the bearing plate and the roof for additional bearing, the use should be limited to short life openings (not to exceed 3 years) unless treated. Bearing plates used in conjunction with wooden materials should be not less than 4 inches square or of equivalent area.

(6) When washers are used, the shape of such washers should conform to the shape of roof bolt head and the shape of the bearing plate and such washers should be of sufficient strength to withstand loads up to the yield point of the roof bolt.

(b) Installation practices:

(1) Finishing bits should be easily identifiable by sight or feel and the diameter should be within a tolerance of plus 0.030-inch minus zero of the manufacturers recommended hole diameter for the anchor used.

(2) Torque ranges specified in the roof control plan should be capable of providing roof bolt loads to within plus or minus 1,000 pounds of 50 percent of either the yield point of the roof bolt being used or the anchorage capacity of the strata, whichever is less. In no case, however, should installed torques provide loads that exceed the yield point of the roof bolt being used or the anchorage capacity. Relationship for determining roof bolt load for torque applied are as follows:

Cone Neck or Self-Centering Roof Bolt

⅝-inch expansion type roof bolt—30 lbs. of load per ft.-lb. of torque.

¾-inch expansion type roof bolt—30 lbs. of load per ft.-lb. of torque.

Standard Roof Bolt Without Hard Washer or Lubricant

⅝-inch expansion type roof bolt—50 lbs. of load per ft.-lb. of torque.

¾-inch expansion type roof bolt—40 lbs. of load per ft.-lb. of torque.

Standard Roof Bolt With Hard Washer or Lubricant

⅝-inch expansion type roof bolt—60 lbs. of load per ft.-lb. of torque.

¾-inch expansion type roof bolt—60 lbs. of load per ft.-lb. of torque.

(3) Each operator should outline and describe roof bolt testing procedures to be followed in the roof control plan. The procedures to be followed should include:

(i) Providing and maintaining an approved, calibrated torque wrench on each roof bolting machine. An approved wrench should be one that will indicate the actual torque on the roof bolt.

(ii) Designating a qualified person to spot-check torques on at least 25 percent of the roof bolts immediately after the working place has been fully bolted. If the majority of the installed torques fall outside the recommended range, the remaining roof bolts in the working place should be tested. If the majority of the torques still fall outside the recommended range, necessary adjustments in the equipment used for tightening the roof bolts should be made immediately. If, after adjustments are made and required torques are not achieved, supplementary support such as additional roof bolts, longer roof bolts with adequate anchorage, posts, cribs, or crossbars should be installed.

(iii) On a daily basis, spot-check torques on at least 10 percent of the roof bolts from the outby corner of the last open crosscut to the face and record the results. This record should show the number of roof bolts tested, number of roof bolts below the recommended range, and the number of roof bolts above the recommended range. If results show that a majority of the roof bolts are not maintaining at least 70 percent of the minimum torque required (50 percent if plates bear against wood), or have exceeded the maximum required torque by 50 percent, supplementary support such as additional roof bolts, longer roof bolts with adequate anchorage, posts, cribs, or crossbars should be installed until a review of the adequacy of the roof control plan is made by an authorized representative of the Secretary.

(4) Devices should be used to compensate for the angle when roof bolts are installed at angles greater than 5° from the perpendicular to the roof line.

(c) Roof bolting pattern:

(1) Roof bolt spacing either lengthwise or crosswise should not exceed 5 feet.

(2) Roof bolts should be installed as close as possible to, but not more than 5 feet from the rib before a sidecut is started.

(3) Roof bolts should be installed as close as possible to, but not more than 5 feet from, the face before starting conventional cutting or a continuous miner run.

(d) Openings should not exceed 20 feet in width where roof bolting is the sole means of roof support.

§ 75.200-8 Criteria—Conventional roof control plan.

A conventional roof control plan is one in which installation of materials other than roof bolts such as metal or wood posts, jacks, or cribs in conjunction with wooden cap blocks (half headers), footers (sills), planks and beams are installed as the sole means of roof support at a face as part of the normal mining cycle.

(a) Support materials should meet the following specifications:

(1) Posts should be of solid, straight grain wood with the ends sawed square and free from defects which would affect their strength.

(2) The diameter of round posts should not be less than one inch for each 15 inches of length, but in no case should the diameter be less than 4 inches; split posts should have a cross-sectional area equal to that required for round posts to equivalent length.

(3) Wooden cap blocks and footers should have flat paralleled sides and be not less than 2 inches thick, 4 inches wide and 12 inches long.

(4) Wooden crossbars and planks should be straight and of solid wood. Crossbars should have a minimum cross-sectional area of 24 square inches and the minimum thickness should be 3 inches. Planks should have a minimum cross-sectional area of 8 square inches and a minimum thickness of 1 inch.

(5) Cribbing material should be of wood having parallel flat sides. In no case should the crib be less than 30 inches square.

(b) Installation practices:

(1) No more than two wooden wedges should be used to install a post.

(2) Posts should not be installed under roof susceptible to sloughing or under disturbed roof without a wooden cap block, plank, or crossbar between the post and the roof.

(3) Posts should be installed tight and on solid footing.

(4) Blocks used for lagging between the roof and wooden crossbars, planks, or metal bars should be spaced so that the load on the supports will be equally distributed.

(5) Cap blocks should be used between jacks and the roof.

(c) Conventional support pattern:

(1) Spacing of roadway roof supports should not exceed 5 feet.

(2) Width of roadways should not exceed 14 feet on the straight and 16 feet on the curves.

(3) Roof supports should be installed to within 5 feet of the uncut face; however, the supports nearest the face may be removed to facilitate the operation of face equipment if equivalent temporary support is installed prior to removal.

(4) When an opening is no longer needed for storing supplies or for travel of equipment the roof at the entrance of all such openings along travelways should be supported by extending the post line across the opening.

(d) Openings should not exceed 20 feet in width where the roof is supported solely by conventional means.

§ 75.200-9 Criteria—Combination roof control plan.

For a plan where both roof bolts and conventional supports are used for roof control at the face, the criteria for a Full Roof Bolting Plan and a Conventional Roof Control Plan should apply with the following modifications:

(a) Any place being driven over 20 feet in width should be supported by a Combination Roof Control Plan.

(b) The roadway should be limited to 16 feet in width on both the straight and the curves to within 10 feet of the uncut face.

(c) A row of posts should be set for each 5 feet of space between the roadway posts and the ribs.

(d) Openings should not exceed 30 feet in width.

§ 75.200-10 Criteria—Spot roof bolting plan.

Spot roof bolting may be used only as a supplement to the approved roof control plan at random locations where adverse roof conditions are encountered. Where spot roof bolting is used, the criteria in § 75.200-7, (a) and (b) of the Full Roof Bolting Plan should apply. In addition, roof bolts should be installed in accordance with roof conditions, but in no case should spacing exceed 4 feet lengthwise and crosswise. Roof bolting should begin under safe roof and continue for the length of the adverse roof condition until safe roof is again encountered.

§ 75.200-11 Criteria—Pillar recovery plan.

Any reduction in pillar size during second mining shall be considered pillar recovery. Second mining is construed to be intentional retreat mining. The following criteria are applicable to pillar recovery roof control plans:

(a) Sections 75.200-7, 75.200-8, and 75.200-9 should apply depending on whether the pillar recovery plan calls for conventional support or a combination of conventional support and roof bolting.

(b) During development, the size and shape of the pillars should be dictated by the depth of cover, height of coal and other conditions associated with the coalbed. The smallest dimension of the pillar should be no less than 20 feet.

(c) Pillar splits and lifts should not exceed 20 feet in width.

(d) A minimum of two rows of breaker posts or the equivalent should be installed on not more than 4-foot centers across each opening leading into pillared areas and such posts should be installed before production is started. Such posts should be installed near the breakline between the lift being started and the gob.

(e) A row of roadside-radius (turn) posts or the equivalent should be installed on not more than 4-foot centers leading into pillar splits, including secondary splits in slabs, wings, or fenders.

(f) The width of the roadway leading from the solid pillars to a final stump (pushout) should not exceed 14 feet. At least two rows of posts or their equivalent should be set on each side of the roadway on not more than 4-foot centers. Only one open roadway leading to a final stump (pushout) should be permitted.

(g) Before full pillar recovery is begun in areas where roof bolts were used as the sole means of roof support and openings are more than 16 feet wide, supplementary support should be installed. Supplementary supports should consist of at least one row of posts installed on either side on not more than 4-foot centers lengthwise and limit the width of all roadways to 16 feet. These supports should be extended from the entrance to the split for at least one full pillar outby the pillar in which the split is being made.

(h) The following criteria should apply to open end pillaring:

(1) At least two rows of breaker posts or their equivalent should be installed between the lift being started and the gob on not more than 4-foot centers before the initial cut is made and should be extended to within 7 feet of the face. The width of the roadway should not exceed 14 feet.

(2) If the roof in open end pillaring has a tendency to hang, falls should be made, or cribs installed in addition to the breakline posts between the active lift and the hanging area. The cribs should be set not more than 8 feet apart. Heavy duty hydraulic jacks set

at centers close enough to give equivalent support may be substituted for cribs, if such jacks are removed remotely.

§ 75.200-12 Criteria—Special roof control plan.

A special roof control plan should be adopted and followed when support is installed on an intermittent basis but only at predetermined locations such as at intersections, or when equipment is especially designed to provide either natural or artificial support as the coal is mined. Special roof control plans also cover experimental installations using new devices, materials, and methods for roof support.

(a) The following criteria should apply to mining systems employing continuous mining machines designed to give natural roof support by means of an arched roof:

(1) Where coal roof other than that included in the arch is necessary for roof support, positive means should be used to assure that at least 6 inches of coal roof is maintained at all times. In the event that less than 6 inches of coal roof is encountered, all work in such places should be stopped, the continuous miner withdrawn, and artificial roof support installed. A roof control plan for the support to be installed in such cases must be submitted for approval.

(2) During the development of four-way intersections, the roof between the tangents of the arches in the entry or room should be supported with artificial roof supports prior to the development of the fourth entrance to such intersection.

(3) All areas where the width of openings is to exceed the normal cutting width of the continuous mining machine should be supported with additional support as specified in the roof control plan before any other work is performed in the place.

(4) All areas where the arch is broken, except planned areas such as those covered in paragraphs (a) (2) and (3) of this section should be considered as having unsupported roof and such roof should have artificial roof supports installed prior to any other work being performed in the area.

(b) The following criteria should apply to mining methods using continuous miners with integral roof bolting equipment where roof bolts are the sole means of roof support:

(1) The distance between roof bolts should not exceed 8 feet crosswise, unless additional material such as wooden planks, wooden beams, or metal straps are installed in conjunction with the roof bolts. Roof bolts installed more than 8 feet but less than 9 feet apart should be supplemented with a wooden plank at least 2 inches thick by 8 inches wide or its equivalent. Roof bolts installed more than 9 feet but less than 10 feet apart should be supplemented with a wooden plank at least 3 inches thick by 8 inches wide or its equivalent. Roof bolts should not be installed more than 10 feet apart.

(2) Work in intersections, pillar splits, or other such places should not be started until additional support has been installed where the roof is supported with only two roof bolts crosswise. Such support should reduce bolt spacing to maximum of 5 feet.

(3) The maximum opening width where the roof is supported by only two roof bolts crosswise should be 16 feet.

(4) The distance between the last row of bolts and the face should not exceed the distance from the head of the machine to the integral roof bolting equipment before starting a continuous miner run.

(c) Before any new support materials, devices or systems are used as a sole means of roof support, their effectiveness should be demonstrated by experimental installations in areas approved by an authorized representative of the Secretary.

§ 75.200-13 Criteria—Temporary support.

(a) The following criteria should apply to the installation of temporary supports in faces:

(1) In areas where permanent artificial support is required temporary support should be used until such permanent support is installed.

(2) Only those persons engaged in installing temporary support should be allowed to proceed beyond the last

permanent support until such temporary supports are installed.

(3) A minimum of two temporary supports should be installed on not more than 5-foot centers and within 5 feet of the rib or face when work is being done between such support and the nearest rib or face. At least four temporary supports should be installed on not more than 5-foot centers when work is being done in other areas of the face inby the last permanent support. No person should be permitted to proceed beyond temporary support in any direction unless such support is within 5 feet of the rib, face, or permanent support.

(b) During rehabilitation work such as rebolting, installing crossbars, or other permanent roof support, taking down loose roof and cleaning up falls of roof, temporary roof supports should be installed and the following criteria should apply:

(1) Where rebolting work is being done or crossbars are being installed, at least two rows of temporary supports on not more than 5-foot centers should be installed across the place so that the work in progress is done between the installed temporary supports and permanent roof supports installed in sound roof. The distance between the permanent supports and the nearest temporary supports should not exceed 5 feet.

(2) Tools used to take down loose material should be of a design that will enable workmen to perform their duties from a safe position without exposure to falling material. Where loose material is being taken down, a minimum of two temporary supports on centers of not more than 5 feet should be set between the workmen and the material if such work cannot be done from an area supported by permanent roof supports.

(3) Where roof falls have occurred a minimum of four temporary supports shall be set before starting any work in and around the affected area. These supports should be located so as to provide the maximum protection for persons working in the area.

§ 75.200-14 Criteria—Roof support recovery.

Any operator who intends to recover roof supports should include a detailed plan for such recovery in the roof control plan. The following criteria should apply to recovery procedures:

(a) Recovery should be done only under the direct supervision of a mine foreman, assistant mine foreman, or section foreman.

(b) Only experienced miners should be assigned to such work.

(c) The person supervising recovery should make a careful examination and evaluation of the roof and designate each support to be recovered.

(d) Supports should not be recovered in the following areas:

(1) Where roof fractures are present or there are other indications of the roof being structurally weak.

(2) Where any second mining has been done.

(3) Where torque readings on roof bolts or visual observations of conventional support indicate excessive loading.

(e) Two rows of temporary supports on not more than 4-foot centers, lengthwise and crosswise, should be set across the place, beginning not more than 4 feet inby the support being recovered. In addition, at least one temporary support should be provided as close as practicable to the support being recovered.

(f) Temporary supports used should not be recovered unless recovery is done remotely from under roof where the permanent supports have not been disturbed and two rows of temporary support, set across the place on 4-foot centers, are maintained at all times between the workmen and the unsupported area.

(g) No one should be permitted to enter any area from which supports have been recovered.

(h) Entrances to the areas from which supports are being recovered should be marked with danger signs placed at conspicuous locations. The danger signs will suffice as long as further support recovery work is being done in the area. If the recovery work is completed or suspended for 3 or more days, the areas should be barricaded.

§ 75.201 Mining methods.

[STATUTORY PROVISIONS]

The method of mining followed in any coal mine shall not expose the miner to unusual dangers from roof falls caused by excessive widths of rooms and entries or faulty pillar recovery methods.

§ 75.201-1 Widths of openings.

(a) The method of mining shall provide widths of openings and pillar dimensions compatible with effective roof control. These widths and dimensions shall be incorporated into the roof control plan submitted for approval.

(b) Where excessive widths result from poor mining practices, additional roof support shall be installed before any travel or other work is done in such area. If excessive widths of openings are a result of coal sloughing, additional support shall be installed and the mining system reevaluated to determine changes that are necessary to minimize such occurrences.

§ 75.201-2 Pillar recovery methods.

In addition to those criteria set forth in § 75.200-11 which may be required in the roof control plan, the following shall apply to pillar recovery:

(a) The overall pillar recovery system shall be designed to minimize the possibility of outbursts or squeezes. The manner and sequence of recovery shall be included in the roof control plan submitted for approval.

(b) Where full pillar recovery is being done, extraction shall be such as to allow total caving of the main roof in the pillared area.

(c) During partial pillar recovery sufficient coal shall be left in place to support the main roof to the extent that the possibility of undue forces overriding the working places will be minimized.

(d) A combination of full and partial pillar recovery shall not be conducted on the same pillar line.

(e) If full extraction of pillars is being done and physical conditions such as standing water, adverse roof conditions, and falls of roof, or law requirements concerning oil and gas wells or surface subsidence dictate that some pillars of coal are to be left in place, a sufficient amount of coal shall be left to support the main roof so as to minimize the possibility of undue forces overriding the working places.

(f) Where full recovery of pillars is planned, the design of the pillars shall be compatible with the planned method of extraction.

(g) Pillaring methods shall eliminate pillar points and pillars that project inby the breakline.

(h) When recovering adjacent pillars left and right from the same opening, mining shall be completed in one such pillar lift and the openings posted off with at least two rows of breaker posts on not more than 4-foot centers before operations are started in the second pillar.

§ 75.201-3 Longwall mining.

Longwall mining shall be considered as a modification of the open-end method of pillar extraction and the support system for the longwall shall be approved on an individual basis.

§ 75.202 Roof support materials.

[STATUTORY PROVISIONS]

The operator, in accordance with the approved plan, shall provide at or near each working face and at such other locations in the coal mines as the Secretary may prescribe an ample supply of suitable materials of proper size with which to secure the roof of all working places in a safe manner. Safety posts, jacks, or other approved devices shall be used to protect the workmen when roof material is being taken down, crossbars are being installed, roof bolt holes are being drilled, roof bolts are being installed, and in such other circumstances as may be appropriate. Loose roof and overhanging or loose faces and ribs shall be taken down or supported. Except in the case of recovery work, supports knocked out shall be replaced promptly.

§ 75.202-1 Adequate supply and location of roof support materials.

The operator shall have an adequate supply of roof support material (including temporary supports) as specified in the approved roof control plan for the type of mining being conducted as close as practical to the working face, but no farther away than the first open crosscut outby the working face unless storing of such supplies in this area poses a hazard to the miner. In such cases supplies shall be stored at an alternate location approved by an authorized representative of the Secretary. Where mining equipment such as roof drilling machines or timbering machines are required to install the supports, such support material may be transported from place to place on the equipment. An adequate supply shall be defined as sufficient material including temporary supports, to support roof exposed by one complete cycle of mining. An additional supply of supplementary roof support materials, such as posts, jacks, crossbars, or different length roof bolts, shall be available in each working section in the event adverse roof conditions, such as water coming from the roof, slips, washouts, wants, roof cracks, are encountered.

§ 75.203 Roof bolt tests.

[STATUTORY PROVISIONS]

When installation of roof bolts is permitted, such roof bolts shall be tested in accordance with the approved roof control plan.

§ 75.203-1 Testing requirements.

The criteria which may be required in the roof control plan for testing installed roof bolts are set forth in § 75.200-7(b)(3), (ii), and (iii).

§ 75.204 Roof bolt recovery.

[STATUTORY PROVISIONS]

Roof bolts shall not be recovered where complete extractions of pillars are attempted, where adjacent to clay veins, or at the locations of other irregularities, whether natural or otherwise, that induce abnormal hazards. Where roof bolt recovery is permitted, it shall be conducted only in accordance with methods prescribed in the approved roof control plan, and shall be conducted by experienced miners and only where adequate temporary support is provided.

§ 75.204-1 Requirements for roof bolt recovery.

To assure that miners are protected during roof bolt recovery work, the operator shall conform with criteria set forth in § 75.200-14.

§ 75.205 Roof testing.

[STATUTORY PROVISIONS]

Where miners are exposed to danger from falls of roof, face, and ribs the operator shall examine and test the roof, face, and ribs before any work or machine is started, and as frequently thereafter as may be necessary to insure safety. When dangerous conditions are found, they shall be corrected immediately.

Subpart D—Ventilation

§ 75.300 Mechanical ventilation—Main fans.

[STATUTORY PROVISIONS]

All coal mines shall be ventilated by mechanical ventilation equipment installed and operated in a manner approved by an authorized representative of the Secretary and such equipment shall be examined daily and a record shall be kept of such examination.

§ 75.300-1 Criteria—For approval of main fan installation and operation.

Sections 75.300-2 through 75.300-3, inclusive, set out the criteria by which Coal Mine Safety District Managers will be guided in approving main fan installation and operation on a mine-by-mine basis. Additional measures may be required. Installation and operating practices not conforming to these criteria may be approved, providing the operator can satisfy the District Manager that the results of such practices will provide no less than the same measure of protection to the miners.

§ 75.300-2 Criteria—Installation of main fans.

(a) Main fans should be:

(1) Installed on the surface.

(2) Installed in fireproof housings and connected to the mine opening with fireproof air ducts.

(3) Equipped with a pressure-recording gage and an automatic signal device designed to give alarm should the fan slow or stop. The signal from this device should be placed so that it will be seen or heard by a responsible person who is always on duty and can hear or will observe such alarm when men are underground and who should take appropriate action immediately as prescribed in § 75.321 or § 75.300-3(b).

(b) To protect main fans from forces coming out of the mine should an explosion occur:

(1) Main fans should be offset not less than 15 feet from the nearest side of the mine opening, and explosion doors or a weak wall having a cross-sectional area equal to or greater than the connection entry should be provided in direct line with possible explosion forces, or

(2) Main fans may be installed in line with a diversion entry, slope, or shaft (fan entry) driven from the mine air courses to the surface. The surface opening of the fan entry should be no less than 15 feet nor more than 100 feet from the surface opening of the connected mine air course (pressure relief entry). The pressure relief entry opening should be provided with a weak wall or explosion doors in direct line with forces of an explosion originating underground and such weak wall or explosion doors should have a cross-sectional area equal to or greater than the pressure relief entry and cross-sectional area of the pressure relief entry should not be less than that of the fan entry. The underground intersection of the fan entry and pressure relief entry should be no less than 15 feet nor more than 100 feet from the surface opening of the pressure relief entry. The pillar of coal between the pressure relief entry and the fan entry should, regardless of coal bed height, contain not less than 2,500 square feet.

(c) Main fans may be driven either by electric motors or internal combustion engines.

(1) When electric motors are used, they should be provided with a separate power circuit independent of any other mine circuit.

(2) When an internal combustion engine is used the engine should be installed in a fireproof housing, located so as to be protected from possible fuel supply fire or explosions and the engine and exhaust should be located out of direct line with the airstream produced by the fan and be vented to the atmosphere in such a manner that the exhaust gases cannot contaminate the mine intake airstream or any enclosure.

(d) In mines ventilated by multiple force or multiple exhaust main fans, each main fan installation should be equipped with fireproof doors so designed and positioned that in event of the failure of a main fan the doors at the fan will automatically close and prevent air reversal through the fan.

(e) In mines ventilated by a combination of force and exhaust main fans, fireproof automatic closing doors should be installed so that in event of fan failure or stoppage, the doors will automatically close to prevent air reversal that would affect the safety of the miners.

(f) The area surrounding all main fans should be kept free of flammable material for at least 100 feet in all directions.

§ 75.300-3 Criteria—Operation of main fans.

(a) All main fans should be kept in continuous operation except in the event of:

(1) Scheduled maintenance or adjustments on idle days when all men other than those performing evaluation or adjustments are withdrawn from the mine and the mine power is cut off.

(2) Uncontrolled stoppage or fan failure.

(3) Other stoppages, when written permission is obtained from an authorized representative of the Secretary.

(b) If an unusual variance in the mine ventilation pressure is observed, or if an electrical or mechanical deficiency of a main fan is detected, the mine superintendent or assistant mine superintendent or mine foreman should be notified immediately and appropriate action or repairs should be instituted promptly.

(c) Airflow should be maintained in all intake and return air courses of a mine. Where multiple fans are used, neutral areas (areas without perceptible air movement) created by pressure equalization between main fans should not be permitted.

§ 75.300-4 Inspection, examinations, and records.

(a) All main fans shall be inspected daily by a person trained and designated by the operator to make such inspections to insure the electrical and mechanical reliability of such fans.

(b) The fan pressure recording gages shall be examined daily and the charts for such gages shall be changed after completing one revolution.

(c) Automatic closing doors as required in multiple fan systems shall be inspected at least once a month (intervals of not more than 31 days), to insure proper operation.

(d) Results of the inspections shall be recorded in a daily fan inspection book approved by the Secretary.

(e) Records of the daily fan inspections and the fan pressure recording gage charts shall be maintained for a minimum of 1 year and such records and charts shall be made available for inspection by interested persons.

(f) The provisions of paragraphs (b) and (e) of this section with respect to fan pressure recording gages will not be applied when a fan pressure recording gage is not required by the District Manager.

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[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.301 Air quality, quantity, and velocity.

[STATUTORY PROVISIONS]

All active workings shall be ventilated by a current of air containing not less than 19.5 volume per centum of oxygen, not more than 0.5 volume per centum of carbon dioxide, and no harmful quantities of other noxious or poisonous gases; and the volume and velocity of the current of air shall be sufficient to dilute, render harmless, and to carry away, flammable, explosive, noxious, and harmful gases, and dust, and smoke and explosive fumes. The minimum quantity of air reaching the last open crosscut in any pair or set of developing entries and the last open crosscut in any pair or set of rooms shall be 9,000 cubic feet a minute, and the minimum quantity of air reaching the intake end of a pillar line shall be 9,000 cubic feet a minute. The minimum quantity of air in any coal mine reaching each working face shall be 3,000 cubic feet a minute. The authorized representative of the Secretary may require in any coal mine a greater quantity and velocity of air when he finds it necessary to protect the health or safety of miners. In robbing areas of anthracite mines, where the air currents cannot be controlled and measurements of the air cannot be obtained, the air shall have perceptible movement.

§ 75.301-1 Quantity of air reaching working face.

A minimum quantity of 3,000 cubic feet a minute of air shall reach each working face from which coal is being cut, mined or loaded and any other working face so designated by the District Manager, in the approved ventilation plan.

§ 75.301-2 Harmful quantities of noxious gases.

Concentrations of noxious or poisonous gases, other than carbon dioxide, shall not exceed the current threshold limit values (TLV) as specified and applied by the American Conference of Governmental Industrial Hygienists. Detectors or laboratory analysis of mine air samples shall be used to determine the concentrations of harmful, noxious or poisonous gases.

§ 75.301-3 Locations of air measurements.

The locations at which the quantity of air shall be measured are as follows:

(a) When a single split of air is used the volume of air shall be measured at the last open crosscut in a pair or set of developing entries or the last open crosscut in any pair or set of rooms which shall be the last crosscut through the line of pillars that separates the intake and return air courses. When the split system of ventilation is used, the volume of air shall be measured in the last open crosscut through the line of pillars that separates the intake and return air courses of each split.

(b) The volume of air at the intake end of a pillar line ventilated by a single split of air, shall be measured in the intake entry furthest from the return air courses and immediately outby the first open crosscut outby the line of pillars being mined. When a split system of ventilation is used, the volume of air shall be measured by the last intake air split point.

(c) When longwall mining is practiced the volume of air shall be measured in the intake entry or entries at the intake end of the longwall face and the longwall shall be constructed as a pillar line.

(d) The volume of air reaching each working face shall be measured at the inby end of the line brattice or other approved device.

§ 75.301-4 Velocity of air; minimum requirements.

(a) On and after March 30, 1971, except in working places using a blowing system as the primary means of face ventilation or in working places where a lower mean entry air velocity has been determined to be adequate to render harmless and carry away methane and to reduce the level of respirable dust to the lowest attainable level by the Coal Mine Safety District Manager, the minimum mean entry air velocity shall be 60 feet a minute in (1) all working places where coal is being cut, mined, or loaded from the working face with mechanical mining equipment, and (2) in any other working place designated by the Coal Mine Safety District Manager for the district in which the mine is located in which excessive amounts of respirable dust are being generated by any type of mechanical mining equipment.

(b)(1) Except as provided in paragraph (b)(2) of this section, and except in working places where combination face ventilation systems are employed, the mean entry air velocity of air passing through any room, entry, crosscut, pillar cut, or other working place shall be established as follows:

(i) The quantity of air, when measured at the inby end of the line brattice or other approved device, shall be determined;

(ii) The cross sectional area of the room, entry, crosscut, pillar cut, or other working place, when measured at or near the inby end of the line brattice system or other approved device, less the cross sectional area of the line brattice system or other approved device, shall be determined;

(iii) The air quantity measured in paragraph (b)(1)(i) of this section shall then be divided by the remaining cross sectional area as determined in paragraph (b)(1)(ii) of this section and the resulting quotient shall constitute the mean entry air velocity; thus: [i/ii]=V.

(2) When longwall mining is used the mean entry air velocity at the longwall face shall be determined by establishing the total intake air quantity delivered to the longwall face and dividing this quantity by the cross sectional area of the longwall place at the entrance to the longwall face.

(c) The determination of mean entry air velocity may be made either immediately before mining equipment enters a working place or during its presence in such working place and the person making such determination shall use an anemometer or other device approved by the Secretary.

§ 75.301-5 Explosive gases other than methane; maximum allowable concentrations.

Notwithstanding the provisions of § 75.301-2, for the purpose of preventing explosions from gases other than methane, the following gases shall not be allowed to accumulate in excess of the concentrations listed below:

(a) Carbon monoxide (CO)—2.5 volume per centum.

(b) Hydrogen (H_2)—.80 volume per centum.

(c) Hydrogen sulfide (H_2S)—.80 volume per centum.

(d) Acetylene (C_2H_2)—.40 volume per centum.

(e) Propane (C_3H_8)—.40 volume per centum.

(f) MAPP (methyl acetylene-propylene-propodiene)—.30 volume per centum.

[36 FR 17336, Aug. 28, 1971]

§ 75.301-6 Explosive gases other than methane; air sampling by the Secretary; general.

Air samples shall be taken periodically by an authorized representative of the Secretary in each underground coal mine, and such samples shall be analyzed to determine the concentration of explosive gases other than methane which may be present.

[36 FR 17336, Aug. 28, 1971]

§ 75.301-7 Explosive gases other than methane; analysis of air samples; notice of violation; control measures and additional samplings requirements.

(a) Where the analysis of air samples taken pursuant to § 75.301-6 shows that the accumulation of any explosive gas is in excess of the limit prescribed for such gas, the Secretary shall issue a written notice to the operator that he is in violation of § 75.301-5, and each such notice of violation shall specify the accumulation of explosive gas which exceeds the maximum allowable concentrations prescribed.

(b) Upon receipt of a notice of violation issued pursuant to paragraph (a) of this section, the operator shall immediately institute ventilation or other control measures in the mine so that the air shall contain less than the maximum allowable concentration of explosive gas prescribed in § 75.301-5.

(c) (1) During the first calendar month following receipt of a notice of violation, and during each calendar month thereafter, until otherwise advised in writing by the Coal Mine Health and Safety District Manager for the district in which the mine is located, the operator shall take one air sample in each area of the mine in which excessive concentrations of explosive gas were shown to be present after analyses conducted in accordance with this section.

(2) Air samples taken in accordance with paragraph (c) (1) of this section shall be promptly transmitted for analysis to:

Gas Analysis Services, Health and Safety Technical Support Center, Mine Safety and Health Administration, 4800 Forbes Avenue, Pittsburgh, PA 15213.

(3) Air samples transmitted in accordance with the provisions of this section shall be clearly marked for identification and include a specific description of the location in the mine from which they were taken.

[36 FR 17336, Aug. 28, 1971]

§ 75.301-8 Potential explosion hazards; control measures; air sampling by the operator; requirements.

(a) Where explosive gases other than methane have been (1) accidentally or inadvertently released in excessive amounts, or (2) where other potential explosion hazards are known by the operator to exist in the mine due to the liberation or presence of an excessive amount of explosive gas other than methane, the operator shall immediately notify the Coal Mine Health and Safety District Manager for the district in which the mine is located of the potential explosion hazard which is present in the mine, and promptly institute ventilation or other control measures to reduce the accumulation of such gases.

(b) Where potential explosion hazards exist due to the presence of excessive amounts of explosive gas other than methane, the operator shall promptly institute an air sampling program which includes frequent periodic samples to determine the concentration of explosive gas in any area of the mine where such gases are known to be present, and he shall continue to take such samples for the entire period during which such potential explosion hazard exists.

(c) (1) Air samples taken in accordance with the provisions of paragraph (b) of this section shall be promptly transmitted for analysis to:

Gas Analysis Services, Health and Safety Technical Support Center, Mine Safety and Health Administration, 4800 Forbes Avenue, Pittsburgh, PA 15213.

(2) Air samples transmitted in accordance with the provisions of this section shall be clearly marked for identification and include a specific description of the location in the mine from which they were taken.

[36 FR 17336, Aug. 28, 1971]

§ 75.302 Ventilation of the working face.

[STATUTORY PROVISIONS]

(a) Properly installed and adequately maintained line brattice or other approved devices shall be continuously used from the last open crosscut of an entry or room of each working section to provide adequate ventilation to the working faces for the miners and to remove flammable, explosive, and noxious gases, dust, and explosive fumes, unless the Secretary or his authorized representative permits an exception to this requirement, where such exception will not pose a hazard to the miners. When damaged by falls or otherwise, such line brattice or other devices shall be repaired immediately.

(b) The space between the line brattice or other approved device and the rib shall be large enough to permit the flow of a sufficient volume and velocity of air to keep the working face clear of flammable, explosive, and noxious gases, dust and explosive fumes.

(c) Brattice cloth used underground shall be of flame-resistant material.

§ 75.302-1 Installation of line brattice and other devices.

(a) Line brattice or any other approved device used to provide ventilation to the working face from which coal is being cut, mined or loaded and other working faces so designated by the Coal Mine Safety Manager, in the approved ventilation plan, shall be installed at a distance no greater than 10 feet from the area of deepest penetration to which any portion of the face has been advanced unless a greater distance is approved by the Coal Mine Safety District Manager of the area in which the mine is located.

(b) When line brattice is used:

(1) The space between the line brattice and the nearest rib shall be sufficiently free of any obstructions such as supplies, equipment or debris to provide for the adequate coursing of air and permit necessary passage through such space; however, this does not exclude the use of auxiliary tubing or ventilation control devices in such space.

(2) Check curtains required in conjunction with the line brattice shall be so installed to minimize air leakage and permit traffic to pass through without adversely affecting face ventilation.

§ 75.302-2 Repair of line brattice.

When the line brattice or other ventilating device is damaged to an extent that ventilation of the working face is inadequate, production activities in the working place shall cease until necessary repairs are made and adequate ventilation restored.

§ 75.302-3 Flame resistant brattice cloth and ventilation tubing.

Brattice cloth (jute or any substitute) and ventilation tubing used underground, shall be flame resistant to the extent that the flame spread index shall be 25 or less except that brattice cloth or ventilation tubing with a flame spread index of 50 or less may be used up until December 30, 1970. The flame spread index shall be determined by ASTM methods of test E-84 or E-162.

§ 75.302-4 Auxiliary fans and tubing.

In the event that auxiliary fans and tubing are used in lieu of or in conjunction with a line brattice system to provide ventilation of the working face:

(a) The fan shall be of a permissible type, maintained in permissible condition, so located and operated to avoid any recirculation of air at any time, and inspected frequently by a certified person when in use.

(1) Fans approved and maintained under Bureau of Mines Schedule 2G or 2F (Part 18 of this chapter) will meet the requirements of this section.

(2) Persons certified under Subpart B of this part will meet the requirements for this section.

(b) In places where auxiliary fans are used, accumulations of methane resulting from unscheduled stoppage of the main fan shall be removed after restoration of normal mine ventilation, by conducting the air current into the place with line brattice or the equivalent. Auxiliary fans shall not be operated in such place during stoppage of normal mine ventilation, and until methane accumulations have been removed.

(c) If the auxiliary fan is stopped or fails, the electrical equipment in the place shall be stopped and the power disconnected at the power source until ventilation in the working place is restored. During such stoppage, the ventilation shall be by means of the primary air current conducted into the place in a manner to prevent accumulation of methane.

(d) In places where auxiliary fans are used, the ventilation during scheduled idle periods such as weekends and idle shifts, shall be by means of the primary air current conducted into the place in a manner to prevent accumulation of methane.

(e) If the air passing through the auxiliary fan or tubing contains 1.0 volume per centum or more of methane, the provisions of § 75.308 shall be applied. Should the requirements of § 75.308 necessitate deenergizing the auxiliary fan, the auxiliary fan shall not be restarted until the methane content in the affected area is less than 1.0 volume per centum and such changes or adjustments have been made to the auxiliary ventilation system as required to insure that the volume of air delivered by the auxiliary system is adequate to maintain the methane content in the auxiliary fan and tubing at less than 1.0 volume per centum.

(f) To insure that an adequate volume and velocity of air is supplied continuously to the working face where auxiliary fan and tubing are used for face ventilation, a line brattice or other approved device shall be installed in accordance with § 75.302-1 before the auxiliary fan is stopped.

(g) All face ventilation systems using auxiliary fans and tubing or machine mounted diffusers shall be approved under the provisions of § 75.316.

§ 75.303 Preshift examination.

[Statutory Provisions]

(a) Within 3 hours immediately preceding the beginning of any shift, and before any miner in such shift enters the active workings of a coal mine, certified persons designated by the operator of the mine shall examine such workings and any other underground area of the mine designated by the Secretary or his authorized representative. Each such examiner shall examine every working section in such workings and shall make tests in each such working section for accumulations of methane with means approved by the Secretary for detecting methane, and shall make tests for oxygen deficiency with a permissible flame safety lamp or other means approved by the Secretary; examine seals and doors to determine whether they are functioning properly; examine and test the roof, face, and rib conditions in such working section; examine active roadways, travelways, and belt conveyors on which men are carried, approaches to abandoned areas, and accessible falls in such section for hazards; test by means of an anemometer or other device approved by the Secretary to determine whether the air in each split is traveling in its proper course and in normal volume and velocity; and examine for such other hazards and violations of the mandatory health or safety standards, as an authorized representative of the Secretary may from time to time require. Belt conveyors on which coal is carried shall be examined after each coal-producing shift has begun. Such mine examiner shall place his initials and the date and time at all places he examines. If such mine examiner finds a condition which constitutes a violation of a mandatory health or safety standard or any condition which is hazardous to persons who may enter or be in such area, he shall indicate such hazardous place by posting a "danger" sign conspicuously at all points which persons entering such hazardous place would be required to pass, and shall notify the operator of the mine. No person, other than an authorized representative of the Secretary or a State mine inspector or persons authorized by the operator to enter such place for the purpose of eliminating the hazardous condition therein, shall enter such place while such sign is so posted. Upon completing his examination, such mine examiner shall report the results of his examination to a person, designated by the operator to receive such reports at a designated station on the surface of the mine, before other persons enter the underground areas of such mine to work in such shift. Each such mine examiner shall also record the results of his examination with ink or indelible pencil in a book approved by the Secretary kept for such purpose in an area on the surface of the mine chosen by the operator to minimize the danger of destruction by fire or other hazard, and the record shall be open for inspection by interested persons.

(b) No person (other than certified persons designated under this § 75.303) shall enter any underground area, except during any shift, unless an examination of such area as prescribed in this § 75.303 has been made within 8 hours immediately preceding his entrance into such area.

OMB CONTROL No. 1219-0075. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.303-1 Determination of course, volume, velocity of air.

To determine whether the air in each split is traveling in its proper course and in normal volume and velocity, the mine examiner shall use an anemometer or other device approved by the Secretary to measure the velocity and determine the volume of air at the following locations:

(a) The last open crosscut of each pair or set of developing entries;

(b) The last open crosscut of each pair or set of rooms;

(c) The intake end of each pillar line.

§ 75.303-2 Air measurement devices; approval; applications for approval.

(a) All devices, other than anemometers, designed and constructed to test air volume or air velocity shall be approved by the Secretary only if such devices are designed and constructed so as not to cause accidents in the use of such equipment.

(b) All devices for testing air volume or air velocity which contain electrical components shall be approved for permissibility under Bureau of Mines Schedule 2G (Part 18 of this chapter).

(c) Applications for approval of air measurement devices other than anemometers may be submitted to the Mine Safety and Health Administration, Approval and Certification Center, Box 201 B, Industrial Park Road, Dallas Pike, Triadelphia, W.Va. 26059.

[35 FR 17890, Nov. 20, 1970, as amended at 43 FR 12320, Mar. 24, 1978]

§ 75.304 On-shift examinations for hazardous conditions.

[STATUTORY PROVISIONS]

At least once during each coal-producing shift, or more often if necessary for safety, each working section shall be examined for hazardous conditions by certified persons designated by the operator to do so. Any such conditions shall be corrected immediately. If such condition creates an imminent danger, the operator shall withdraw all persons from the area affected by such conditions to a safe area, except those persons referred to in section 104(d) of the Act, until the danger is abated Such examination shall include tests for methane with a means approved by the Secretary for detecting methane and for oxygen deficiency with a permissible flame safety lamp or other means approved by the Secretary.

§ 75.304-1 Coal-producing shift.

The term "coal-producing shift" means any shift during which one or more of the following operations are performed: Cutting, blasting, or loading of coal, or the hauling of coal from the face areas, regardless of whether the coal is dumped at a tipple.

§ 75.304-2 Examination of working sections.

Working sections to be examined for hazardous conditions by a certified person under § 75.304 are those working sections in which work is performed in a coal producing shift.

§ 75.304-3 Tests for methane.

Additional tests to determine the methane content in the air in all working sections may be required by the Coal Mine Safety District Manager if necessary for safety and a record shall be kept of all tests. Until December 31, 1970, a permissible flame safety lamp may be used to make tests for methane required by the regulations in this part. On and after December 31, 1970, a methane detector approved by the Secretary shall be used for such tests and a permissible flame safety lamp may be used as a supplementary testing device.

§ 75.305 Weekly examinations for hazardous conditions.

[Statutory Provisions]

In addition to the preshift and daily examinations required by this Subpart D, examinations for hazardous conditions, including tests for methane, and for compliance with the mandatory health or safety standards, shall be made at least once each week by a certified person designated by the operator in the return of each split of air where it enters the main return, on pillar falls, at seals, in the main return, at least one entry of each intake and return aircourse in its entirety, idle workings, and, insofar as safety considerations permit, abandoned areas. Such weekly examinations need not be made during any week in which the mine is idle for the entire week, except that such examination shall be made before any other miner returns to the mine. The person making such examinations and tests shall place his initials and the date and time at the places examined, and if any hazardous condition is found, such condition shall be reported to the operator promptly. Any hazardous condition shall be corrected immediately. If such condition creates an imminent danger, the operator shall withdraw all persons from the area affected by such condition to a safe area, except those persons referred to in section 104(d) of the Act, until such danger is abated. A record of these examinations, tests, and actions taken shall be recorded in ink or indelible pencil in a book approved by the Secretary kept for such purpose in an area on the surface of the mine chosen by the mine operator to minimize the danger of destruction by fire or other hazard, and the record shall be open for inspection by interested persons.

OMB Control No. 1219-0075. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.305-1 Intervals of examination.

Examinations as required by § 75.305 shall be made at least once each week and the phrase "once each week" shall mean at intervals not exceeding 7 days rather than at any time during each calendar week.

§ 75.305-2 Tests for methane.

Until December 31, 1970, a permissible flame safety lamp may be used to make tests for methane required by the regulations in this part. On and after December 31, 1970, a methane detector approved by the Secretary shall be used for such tests and a permissible flame safety lamp may be used as a supplementary testing device.

§ 75.306 Weekly ventilation examinations.

[Statutory Provisions]

At least once each week, a qualified person shall measure the volume of air entering the main intakes and leaving the main returns, the volume passing through the last open crosscut in any pair or set of developing entries and the last open crosscut in any pair or set of rooms, the volume and, when the Secretary so prescribes, the velocity reaching each working face, the volume being delivered to the intake end of each pillar line, and the volume at the intake and return of each split of air. A record of such measurements shall be recorded in ink or indelible pencil in a book approved by the Secretary kept for such purpose in an area on the surface of the coal mine chosen by the operator to minimize the danger of destruction by fire or other hazard, and the record shall be open for inspection by interested persons.

OMB CONTROL NO. 1219-0075. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.306-1 Qualified person.

The air measurements required by § 75.306 shall be made by a qualified person as defined in § 75.152, using an anemometer or other device approved by the Secretary.

§ 75.306-2 Intervals of examinations.

The phrase "once each week" shall mean at intervals not exceeding 7 days rather than at any time during each calendar week.

§ 75.307 Methane examinations.

[STATUTORY PROVISIONS]

At the start of each shift, tests for methane shall be made at each working place immediately before electrically operated equipment is energized. Such tests shall be made by qualified persons. If 1.0 volume per centum or more of methane is detected, electrical equipment shall not be energized, taken into, or operated in, such working place until the air therein contains less than 1.0 volume per centum of methane. Examinations for methane shall be made during the operation of such equipment at intervals of not more than 20 minutes during each shift, unless more frequent examinations are required by an authorized representative of the Secretary. In conducting such tests, such person shall use means approved by the Secretary for detecting methane.

§ 75.307-1 Methane examinations at face.

An examination for methane shall be made at the face of each working place during each shift and immediately prior to the entry of such electrical equipment into any working place. Until December 31, 1970, a permissible flame safety lamp may be used to make tests for methane required by the regulations in this part. On and after December 31, 1970, a methane detector approved by the Secretary shall be used for such tests and a permissible flame safety lamp may be used as a supplementary testing device.

§ 75.308 Methane accumulations in face areas.

[STATUTORY PROVISIONS]

If at any time the air at any working place, when tested at a point not less than 12 inches from the roof, face, or rib, contains 1.0 volume per centum or more of methane, changes or adjustments shall be made at once in the ventilation in such mine so that such air shall contain less than 1.0 volume per centum of methane. While such changes or adjustments are underway and until they have been achieved, power to electric face equipment located in such place shall be cut off, no other work shall be permitted in such place, and due precautions shall be carried out under the direction of the operator or his agent so as not to endanger other areas of the mine. If at any time such air contains 1.5 volume per centum or more of methane, all persons, except those referred to in section 104(d) of the Act, shall be withdrawn from the area of the mine endangered thereby to a safe area, and all electric power shall be cut off from the endangered area of the mine, until the air in such working place shall contain less than 1.0 volume per centum of methane.

§ 75.308-1 Changes or adjustments in ventilation.

The "changes or adjustments" which shall be made in the ventilation means increasing the quantity or improving the distribution of air in the affected working place to the extent sufficient to reduce and maintain the methane content less than 1.0 volume per centum when operations are resumed.

§ 75.308-2 Tests for methane.

Until December 31, 1970, a permissible flame safety lamp may be used to make tests for methane required by the regulations in this part. On and after December 31, 1970, a methane detector approved by the Secretary shall be used for such tests and a permissible flame safety lamp may be used as a supplementary testing device.

§ 75.309 Return air; tests and adjustments.

[STATUTORY PROVISIONS]

(a) If, when tested, a split of air returning from any working section contains 1.0 volume per centum or more of methane, changes or adjustments shall be made at once in the ventilation in the mine so that such returning air shall contain less than 1.0 volume per centum of methane. Tests under this § 75.309 shall be made at 4-hour intervals during each shift by a qualified person designated by the operator of the mine. In making such tests, such person shall use means approved by the Secretary for detecting methane.

(b) If, when tested, a split of air returning from any working section contains 1.5 volume per centum or more of methane, all persons except those persons referred to in section 104(d) of the Act, shall be withdrawn from the area of the mine endangered thereby to a safe area and all electric power shall be cut off from the endangered area of the mine, until the air in such split shall contain less than 1.0 volume per centum of methane.

§ 75.309-1 Tests for methane.

Until December 31, 1970, a permissible flame safety lamp may be used to make tests for methane as required by the regulations in this part. On and after December 31, 1970, a methane detector approved by the Secretary shall be used for such tests and a permissible flame safety lamp may be used as a supplementary testing device.

§ 75.309-2 Location of methane test.

The methane content in a split of air returning from any working section shall be measured at such point or points where methane may be present in the air current in such split between the last working place of the working section ventilated by the split and the junction of such split with another airsplit or the location at which such split is used to ventilate seals or abandoned areas. Tests to determine the methane content of such split shall be made at a point not less than 12 inches from the roof or ribs.

§ 75.309-3 Changes or adjustments in ventilation.

The "changes or adjustments" which shall be made in the ventilation means increasing the quantity of air in the affected split or improving the distribution of air in the working section to the extent that the methane content in the affected split is reduced and maintained less than 1.0 volume per centum.

§ 75.309-4 Record of tests.

The results of such tests shall be recorded in the daily record book located on the surface.

OMB CONTROL No. 1219-0075. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.310 Methane in virgin territory.

[STATUTORY PROVISIONS]

In virgin territory, if the quantity of air in a split ventilating the active workings in such territory equals or exceeds twice the minimum volume of air prescribed in § 75.301 for the last open crosscut, if the air in the split returning from such workings does not pass over trolley wires or trolley feeder wires, and if a certified person designated by the operator is continually testing the methane content of the air in such split during mining operations in such workings, it shall be necessary to withdraw all persons, except those referred to in section 104(d) of the Act, from the area of the mine endangered thereby to a safe area and all electric power shall be cut off from the endangered area only when the air returning from such workings contains 2.0 volume per centum or more of methane.

§ 75.310-1 Virgin territory.

The term "virgin territory" means that area of a mine that is being penetrated for the first time, is not surrounded on all sides by previous mining, and is of such extent that there has not been sufficient mining to reduce the amount of methane liberated during the extraction process.

§ 75.310-2 Tests for methane.

Until December 31, 1970, a permissible flame safety lamp may be used to make tests for methane required by the regulations in this part. On and after December 31, 1970, a methane detector approved by the Secretary shall be used for such tests and a permissible flame safety lamp may be used as a supplementary testing device.

§ 75.310-3 Location of methane tests.

The methane content in a split of air returning from any active workings of a mine shall be measured at such point or points where methane may be present in the air current in such split between the last working place ventilated by the split and the junction of such split with another air split or at a point where such split is used to ventilate seals or abandoned areas. Tests to determine the methane content of such split shall be made at a point not less than 12 inches from the roof or ribs.

§ 75.311 Air passing opening of abandoned areas.

[STATUTORY PROVISIONS]

Air which has passed by an opening of any abandoned area shall not be used to ventilate any working place in the coal mine if such air contains 0.25 volume per centum or more of methane. Examinations of such air shall be made during the preshift examination required by § 75.303. In making such tests, a certified person designated by the operator shall use means approved by the Secretary for detecting methane. For the purposes of this § 75.311, an area within a panel shall not be deemed to be abandoned until such panel is abandoned.

§ 75.311-1 Approved means for detecting methane.

Tests to determine whether the air contains 0.25 volume per centum or more methane, shall be made with a methane detector approved by the Secretary.

§ 75.312 Air passing through abandoned, inaccessible, or robbed area.

[STATUTORY PROVISIONS]

Air that has passed through an abandoned area or an area which is inaccessible or unsafe for inspection shall not be used to ventilate any working place in any mine. No air which has been used to ventilate an area from which the pillars have been removed shall be used to ventilate any working place in a mine, except that such air, if it does not contain 0.25 volume per centum or more of methane, may be used to ventilate enough advancing working places immediately adjacent to the line of retreat to maintain an orderly sequence of pillar recovery on a set of entries.

§ 75.312-1 Pillared areas.

The phrase "an area from which the pillars have been removed" includes the area where second mining has been done regardless of the amount of recovery obtained. Second mining is construed to be intentional retreat mining.

§ 75.312-2 Tests for methane.

Tests to determine whether the air contains 0.25 volume per centum or more methane shall be made with a methane detector approved by the Secretary, and such test shall be made in the intake air current at a point between the area from which pillars have been removed and the adjacent working places.

§ 75.313 Methane monitor.

[STATUTORY PROVISIONS]

The Secretary or his authorized representative shall require, as an additional device for detecting concentrations of methane, that a methane monitor, approved as reliable by the Secretary after March 30, 1970, be installed, when available, on any electric face cutting equipment, continuous miner, longwall face equipment, and loading machine, except that no monitor shall be required to be installed on any such equipment prior to the date on which such equipment is required to be permissible under §§ 75.500, 75.501, and 75.504. When installed on any such equipment, such monitor shall be kept operative and properly maintained and frequently tested as prescribed by the Secretary. The sensing device of such monitor shall be installed as close to the working face as practicable. Such monitor shall be set to deenergize automatically such equipment when such monitor is not operating properly and to give a warning automatically when the concentration of methane reaches a maximum percentage determined by an authorized representative of the Secretary which shall not be more than 1.0 volume per centum of methane. An authorized representative of the Secretary shall require such monitor to deenergize automatically equipment on which it is installed when the concentration of methane reaches a maximum percentage determined by such representative which shall not be more than 2.0 volume per centum of methane.

§ 75.313-1 Methane monitors, maintenance.

The operator of any mine in which methane monitors are installed on any equipment shall establish and adopt a definite maintenance program designed to keep such monitors operative and a written description of such program shall be available for inspection. At least once each month the methane monitors shall be checked for operating accuracy with a known methane-air mixture and shall be calibrated as necessary. A record of calibration tests shall be kept in a book approved by the Secretary.

OMB CONTROL No. 1219-0067. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.314 Inspection of idle and abandoned areas.

[STATUTORY PROVISIONS]

Idle and abandoned areas shall be inspected for methane and for oxygen deficiency and other dangerous conditions by a certified person with means approved by the Secretary as soon as possible but not more than 3 hours before other persons are permitted to enter or work in such areas. Persons, such as pumpmen, who are required regularly to enter such areas in the performance of their duties, and who are trained and qualified in the use of means approved by the Secretary for detecting methane and in the use of a permissible flame safety lamp or other means approved by the Secretary for detecting oxygen deficiency are authorized to make such examinations for themselves, and each such person shall be properly equipped and shall make such examinations upon entering any such area.

§ 75.314-1 Test for methane.

Until December 31, 1970, a permissible flame safety lamp may be used to make tests for methane required by the regulations in this part. On and after December 31, 1970, a methane detector approved by the Secretary shall be used for such tests and a permissible flame safety lamp may be used as a supplemental testing device.

§ 75.315 Examinations before intentional roof fall.

[STATUTORY PROVISIONS]

Immediately before an intentional roof fall is made, pillar workings shall be examined by a qualified person designated by the operator to ascertain whether methane is present. Such person shall use means approved by the Secretary for detecting methane. If in such examination, methane is found in amounts of 1.0 volume per centum or more, such roof fall shall not be made until changes or adjustments are made in the ventilation so that the air shall contain less than 1.0 volume per centum of methane.

§ 75.315-1 Test for methane.

Until December 31, 1970, a permissible flame safety lamp may be used to make tests for methane required by the regulations in this part. On and after December 31, 1970, a methane detector approved by the Secretary shall be used for such tests and a permissible flame safety lamp may be used as a supplemental testing device.

§ 75.316 Ventilation system and methane and dust control plan.

[STATUTORY PROVISIONS]

A ventilation system and methane and dust control plan and revisions thereof suitable to the conditions and the mining system of the coal mine and approved by the Secretary shall be adopted by the operator and set out in printed form on or before June 28, 1970. The plan shall show the type and location of mechanical ventilation equipment installed and operated in the mine, such additional or improved equipment as the Secretary may require, the quantity and velocity of air reaching each working face, and such other information as the Secretary may require. Such plan shall be reviewed by the operator and the Secretary at least every 6 months.

OMB CONTROL No. 1219-0075. (47 FR 14696, 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, 14706, Apr. 6, 1982]

§ 75.316-1 Information to be submitted by operator.

The operator shall submit to the Coal Mine Safety District Manager in whose district such mine is located, the following:

(a) An accurate up-to-date map of the coal mine at a scale of not more than 500 feet to the inch and supporting data which shall include:

(1) The limits of the mine property including all known underground workings bordering the mine above and below and on adjacent properties.

(2) The location of all oil and gas wells.

(3) The location of all surface installed fans, type of fan, manufacturer's name, size of fan, and complete current operating specifications.

(4) Location of all surface mine openings.

(5) Any abnormal conditions or reservations, such as faults which may affect mine ventilation system design.

(6) Projections of anticipated mine development for at least 1 year.

(7) Direction and volume of air at each surface mine opening.

(8) All underground workings with the active working sections delineated.

(9) Location of all stoppings, overcasts, undercasts, regulators, seals, and ventilating and man doors.

(10) The volume of air entering and leaving each split, passing through the last open crosscut in each set of entries and rooms, at the intake end of each pillar line, and at each working face.

(11) The velocity of the air current, when such velocity is required at each working face, in all conveyor belt haulage entries, where trolley haulage systems are maintained, and where trolley wires and trolley feeder wires are installed.

(12) Average entry height in conveyor belt and trolley haulage systems.

(13) Areas which have been abandoned and areas from which pillars have been wholly or partially removed.

(b) A ventilation system and methane and dust control plan which shall show in detail:

(1) The methane and dust control practices along all haulageways and travelways, at all transfer points, at underground crushers and dumps, in all active working places and in such other areas as may be required by such District Manager.

(2) The specific locations in the mine where designated area samples for purposes of § 70.208 (Bimonthly sampling; designated areas) of this title will be collected, including the specific location of each sampling device.

(3) All face ventilation systems used and drawings illustrating system use, anticipated air quantities and velocities in the working place and the use and application of the system under all anticipated mining conditions.

(4) When auxiliary face ventilation systems are used, a detailed plan of such system including equipment specifications, fan capacity, method of application, and methods to be used for maintaining continuous airflow to the working face in event of auxiliary equipment failure.

(5) The bleeder entry system, when such system is used including:

(i) Methods for maintaining the bleeder entries free of obstructions such as roof falls and standing water.

(ii) Ventilating devices such as regulators, stoppings and bleeder connectors used to control air movement through the gob bleeder entries.

OMB CONTROL No. 1219-0075. (47 FR 14696, Apr. 6, 1982)

(Sec. 101, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 (30 U.S.C. 811); Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 1970, as amended at 45 FR 24005, Apr. 8, 1980; 47 FR 14696, Apr. 6, 1982]

§ 75.316-2 Criteria for approval of ventilation system and methane and dust control plan.

This section sets out the criteria by which District Managers will be guided in approving a ventilation system and dust control plan on a mine-by-mine basis. Additional measures may be required. A ventilation system and dust control plan not conforming to these criteria may be approved, providing the operator can satisfy the District Manager that the results of such ventilation system and dust control plan will provide no less than the same measure of protection to the miners.

(a) In mines using multiple main fans, the ventilation system should be so arranged that no adverse air reversal will occur, should failure or stoppage of any main fan or fans occur.

(b) Permanent stoppings, overcasts, undercasts, and shaft partitions should be constructed of substantial, incombustible material, such as concrete, concrete blocks, cinder block, brick or tile, or some other incombustible material having sufficient strength to serve the purpose for which the stopping or partition is intended. In heavy or caving areas, timbers laid longitudinally "skin to skin" may be used. Such permanent stoppings should be erected between the intake and return aircourses in entries and should be maintained to and including the third connecting crosscut outby the faces of the entries. Permanent stoppings should be used to separate belt haulage entries from entries used as intake and return aircourses.

(c) A crosscut should be provided at or near the face of each entry or room before the place is abandoned.

(d) The methane content in any return aircourse other than an aircourse returning the split of air from a working section (as provided in §§ 75.309 and 75.310) should not exceed 2.0 volume per centum. The methane content in the air in active workings shall be less than 1.0 volume per centum. If, at any time, the air in any active working contains 1.0 volume per centum or more of methane, changes or adjustments shall be made at once in the ventilation in the mine so that air shall contain less than 1.0 volume per centum of methane.

(e) Bleeder entries, bleeder systems, or equivalent means should be used in all active pillaring areas to ventilate the mined areas from which the pillars have been wholly or partially extracted, so as to control the methane content in such areas. Bleeder entries or bleeder systems established after June 28, 1970, should conform with the requirements of this § 75.316-2.

(1) Bleeder entries shall be defined as special aircourses developed and maintained as part of the mine ventilation system and designed to continuously move air-methane mixtures from the gob, away from active workings and deliver such mixtures to the mine return aircourses. Bleeder entries should be connected to those areas from which pillars have been wholly or partially extracted at strategic locations in such a way to control airflow through such gob area, to induce drainage of gob gas from all portions of such gob areas and to minimize the hazard from expansion of gob gases due to atmospheric pressure change.

(2) Bleeder systems shall include any combination of bleeder entries, bleeder entry connections to any area from

which pillars are wholly or partially extracted and all associated ventilation control devices. Such systems should extend from active pillar line of such gob to the intersection of that bleeder split with any other split of air, and shall not include active workings.

(f)(1) Bleeder entries developed after June 28, 1970, should be adequately maintained and free of water to permit safe travel or, if such bleeder entries cannot be traveled without exposing the mine examiner to undue hazard, such bleeder system should be designed and maintained so that bleeder entry performance can be evaluated for adequacy and continuity by a means approved by the Coal Mine Safety District Manager.

(2) When the mine operator deems that safe examination can be made such examination should be made at least once each week by a certified person designated by the operator to do so and the results of such examinations shall be recorded in a book as prescribed in § 75.305. The certified person shall place his initials, the time and the date at as many locations in the bleeder entries as are necessary to indicate that the entire length has been examined.

(3) When bleeder entry travel is considered unsafe the evaluation of bleeder entry performance should be adequate to indicate that the bleeder system is functioning as specified in § 75.316-3(e)(1) and shall be made at least once each week by a certified person or persons and the results shall be recorded in a book as prescribed in § 75.305. To protect the safety of the miners when bleeder entry performance evaluation requires altering the normal airflow through the affected area, such evaluation should be made during idle shifts with power cut off from the affected area. Due precaution should be taken so as not to endanger any other area of the mine and suitable examinations for methane should be made at the edges of the pillar and such other places as may be required.

(g) The ventilation pressure differential between the active pillar line and the junction of any bleeder connection to the bleeder entries of such system should at all times be adequate to insure gob gas drainage to the bleeder entries. The pressure differential shall be considered adequate when perceptible air-flow exists in all open or regulated bleeder connections, as determined with chemical smoke or other approved means.

(h) The methane content of the air current in the bleeder split at the point where such split enters any other air split should not exceed 2.0 volume per centum.

(i) When the return aircourses from all or part of the bleeder entries of a gob area and air other than that used to ventilate the gob area is passing through the return aircourses, the bleeder connectors between the return air courses and the gob shall be considered as bleeder entries and the concentration of methane should not exceed 2.0 volume per centum at the intersection of the bleeder connectors and the return aircourses.

§ 75.317 Maintenance of detecting devices.

[STATUTORY PROVISIONS]

Each operator shall provide for the proper maintenance and care of the permissible flame safety lamp or any other approved device for detecting methane and oxygen deficiency by a person trained in such maintenance, and, before each shift, care shall be taken to insure that such lamp or other device is in a permissible condition.

§ 75.318 Pillar recovery without bleeder system.

[STATUTORY PROVISIONS]

Where areas are being pillared on March 30, 1970, without bleeder entries, or without bleeder systems or any equivalent means, pillar recovery may be completed in the area, to the extent approved by an authorized representative of the Secretary, if the edges of pillar lines adjacent to active workings are ventilated with sufficient air to keep the air in open areas along the pillar lines below 1.0 volume per centum of methane.

§ 75.319 Ventilation of mechanized mining sections.

[STATUTORY PROVISIONS]

Each mechanized mining section shall be ventilated with a separate split of intake air directed by overcasts, undercasts, or the equivalent, except an extension of time, not in excess of 9 months, may be permitted by the Secretary, under such conditions as he may prescribe, whenever he determines that this subsection cannot be complied with on March 30, 1970.

§ 75.319-1 Mechanized mining section.

The term "mechanized mining section" means an area of a mine in which coal is mined with one set of production equipment, characterized in a conventional mining section by a single loading machine, or in a continuous mining section by a single continuous mining machine, and which is comprised of a number of contiguous working places. Specialized mining sections, such as longwall mining sections, which utilize equipment other than specified in this section, may, if approved by the Coal Mine Safety District Manager, be ventilated by a single split of air.

§ 75.320 Examination for methane before blasting.

[STATUTORY PROVISIONS]

In all underground areas of a coal mine, immediately before firing each shot or group of multiple shots and after blasting is completed, examinations for methane shall be made by a qualified person with means approved by the Secretary for detecting methane. If methane is found in amounts of 1.0 volume per centum or more, changes or adjustments shall be made at once in the ventilation so that the air shall contain less than 1.0 volume per centum of methane. No shots shall be fired until the air contains less than 1.0 volume per centum of methane.

§ 75.321 Stoppage of fans, plans.

[STATUTORY PROVISIONS]

Each operator shall adopt a plan on or before May 29, 1970, which shall provide that when any mine fan stops, immediate action shall be taken by the operator or his agent (a) to withdraw all persons from the working sections, (b) to cut off the power in the mine in a timely manner, (c) to provide for restoration of power and resumption of work if ventilation is restored within a reasonable period as set forth in the plan after the working places and other active workings where methane is likely to accumulate are reexamined by a certified person to determine if methane in amounts of 1.0 volume per centum or more exists therein, and (d) to provide for withdrawal of all persons from the mine if ventilation cannot be restored within such reasonable time. The plan and revisions thereof approved by the Secretary shall be set out in printed form and a copy shall be furnished to the Secretary or his authorized representative.

§ 75.321-1 Reasonable period.

Unless a different period of time is approved by the Coal Mine Safety District Manager, "reasonable period" referred to in § 75.321 means a time lapse of not more than 15 minutes.

§ 75.322 Change in ventilation.

[STATUTORY PROVISIONS]

Changes in ventilation which materially affect the main air current or any split thereof and which may affect the safety of persons in the coal mine shall be made only when the mine is idle. Only those persons engaged in making such changes shall be permitted in the mine during the change. Power shall be removed from the areas affected by the change before work starts to make the change and shall not be restored until the effect of the change has been ascertained and the affected areas determined to be safe by a certified person.

§ 75.323 Countersigning of reports.

[STATUTORY PROVISIONS]

The mine foreman shall read and countersign promptly the daily reports of the preshift examiner and assistant mine foreman, and he shall read and countersign promptly the weekly report covering the examinations for hazardous conditions. Where such reports disclose hazardous conditions, they shall be corrected promptly. If such conditions create an imminent danger, the operator shall withdraw all persons from, or prevent any person from entering, as the case may be, the area affected by such conditions, except those persons referred to in section 104(d) of the Act, until such danger is abated. The mine superintendent or assistant superintendent of the mine shall also read and countersign the daily and weekly reports of such persons.

§ 75.324 Reports by mine foremen.

[STATUTORY PROVISIONS]

Each day, the mine foreman and each of his assistants shall enter plainly and sign with ink or indelible pencil in a book approved by the Secretary provided for that purpose a report of the condition of the mine or portion thereof under his supervision, which report shall state clearly the location and nature of any hazardous condition observed by him or reported to him during the day and what action was taken to remedy such condition. Such book shall be kept in an area on the surface of the mine chosen by the operator to minimize the danger of destruction by fire or other hazard, and shall be open for inspection by interested persons.

§ 75.325 Reopening mines.

[STATUTORY PROVISIONS]

Before a coal mine is reopened after having been abandoned or declared inactive by the operator, the Secretary shall be notified, and an inspection shall be made of the entire mine by an authorized representative of the Secretary before mining operations commence.

§ 75.326 Aircourses and belt haulage entries.

[STATUTORY PROVISIONS]

In any coal mine opened after March 30, 1970, the entries used as intake and return air courses shall be separated from belt haulage entries, and each operator of such mine shall limit the velocity of the air coursed through belt haulage entries to the amount necessary to provide an adequate supply of oxygen in such entries, and to insure that the air therein shall contain less than 1.0 volume per centum of methane, and such air shall not be used to ventilate active working places. Whenever an authorized representative of the Secretary finds, in the case of any coal mine opened on or prior to March 30, 1970, which has been developed with more than two entries, that the conditions in the entries, other than belt haulage entries, are such as to permit adequately the coursing of intake or return air through such entries, (a) the belt haulage entries shall not be used to ventilate, unless such entries are necessary to ventilate, active working places, and (b) when the belt haulage entries are not necessary to ventilate the active working places, the operator of such mine shall limit the velocity of the air coursed through the belt haulage entries to the amount necessary to provide an adequate supply of oxygen in such entries, and to insure that the air therein shall contain less than 1.0 volume per centum of methane.

§ 75.327 Aircourses and trolley haulage systems.

[STATUTORY PROVISIONS]

In any coal mine opened on or after March 30, 1970, or, in the case of a coal mine opened prior to such date, in any new working section of such mine, where trolley haulage systems are maintained and where trolley wires or trolley feeder wires are installed, an authorized representative of the Secretary shall require a sufficient number of entries or rooms as intake aircourses in order to limit, as prescribed by the Secretary, the velocity of air currents on such haulageways for the purpose of minimizing the hazards associated with fires and dust explosions in such haulageways.

§ 75.327-1 Velocity of air.

Unless a higher velocity is approved by the Coal Mine Safety District Manager, the velocity of the air current in the trolley haulage entries shall be limited to not more than 250 feet a minute. A higher air velocity may be required to limit the methane content in such haulage entries or elsewhere in the mines to less than 1.0 per centum and provide an adequate supply of oxygen.

§ 75.328 Ventilation during pillar extraction.

[Statutory Provision]

While pillars are being extracted in any area of a coal mine, such area shall be ventilated in the manner prescribed by this Subpart D "Ventilation."

§ 75.329 Bleeder systems.

[Statutory Provision]

On or before December 30, 1970, all areas from which pillars have been wholly or partially extracted and abandoned areas, as determined by the Secretary or his authorized representative, shall be ventilated by bleeder entries or by bleeder systems or equivalent means, or be sealed, as determined by the Secretary or his authorized representative. When ventilation of such areas is required, such ventilation shall be maintained so as continuously to dilute, render harmless, and carry away methane and other explosive gases within such areas and to protect the active workings of the mine from the hazards of such methane and other explosive gases. Air coursed through underground areas from which pillars have been wholly or partially extracted which enters another split of air shall not contain more than 2.0 volume per centum of methane, when tested at the point it enters such other split. When sealing is required, such seals shall be made in an approved manner so as to isolate with explosion-proof bulkheads such areas from the active workings of the mine.

§ 75.329-1 Sealing or ventilation of pillared or abandoned area.

(a) All areas of a coal mine from which the pillars have been wholly or partially extracted and abandoned areas shall be ventilated or sealed by December 30, 1970. For those coal mines in which ventilation can be maintained so as to continuously dilute, render harmless and carry away methane and other explosive gases within such areas and to protect the active workings of the mine from hazards of such methane and other explosive gases, the operator shall request permission from the Coal Mine Safety District Manager in whose district the mine is located to ventilate such areas.

(b) The request for permission to ventilate such areas must be submitted in time to allow consideration of the request, to obtain approval, and to permit the operator to install the ventilation system, or to install seals in the event the request to ventilate is denied, on or before December 30, 1970.

(c) The determination of whether ventilation will be permitted will be made after taking into consideration the history of methane and other explosive gases in the mine, the size of the gob or abandoned areas, and if the areas can be ventilated adequately.

(d) To be considered for approval the request shall contain the following information provided by the mine operator.

(1) Name of mine and company.

(2) Location of mine (town, county, State).

(3) Operator's name and address.

(4) Date of application.

(5) A detailed history of the methane content determined throughout the mine and when available, the volume of air in which such methane determinations were made, to support the operator's application to ventilate.

(e) A description of the method by which the areas from which the pillars have been wholly or partially extracted and abandoned areas shall be ventilated and such maps and drawings as may be required to illustrate such method and to indicate existing or proposed air volumes used to ventilate such areas.

(f) The signature and title of the person who submits the application for the operator.

§ 75.329-2 Construction of seals or bulkheads.

Pending the development and publication of definitive specifications for explosion-proof seals or bulkheads, such seals or bulkheads may be constructed of solid, substantial, and incombustible materials such as concrete, brick, cinder block, or tile, or the equivalent, sufficient to prevent an explosion which may occur in the atmosphere on one side of the seal or bulkhead from propagating to the atmosphere on the other side; provided, however, that upon publication of definitive specifications, all such seals or bulkheads, including those in place at the time of such publication, shall be required to meet or exceed those specifications.

§ 75.330 Sealing abandoned sections.

[STATUTORY PROVISIONS]

In the case of mines opened on or after March 30, 1970, or in the case of working sections opened on or after such date in mines open prior to such date, the mining system shall be designed in accordance with a plan and revisions thereof approved by the Secretary and adopted by such operator so that, as each working section of the mine is abandoned, it can be isolated from the active workings of the mine with explosion-proof seals or bulkheads.

§ 75.330-1 Plan for sealing abandoned sections.

For approval the plan for isolating each set of cross entries, room entries, or panel entries shall include the following:

(a) A mine map at a scale not more than 500 feet to the inch which is sufficiently detailed to illustrate the mining system employed, depth of cover and dimensions of barrier pillars left in place bordering such areas, the proximity of all active workings, and the proposed location and sequence of construction of all necessary mine seals required, when mining is completed in a mining area. Such map shall illustrate the location of such mine seals as may be required should mining conditions necessitate abandonment of a mining area prior to the scheduled completion date.

(b) A detailed drawing or drawings of proposed explosion-proof seal construction which shall meet the requirements of § 75.329-2. Such drawings shall show the pillars in which the seals will be erected and such pillars shall be of sufficient size and number to protect the seals.

Subpart E—Combustible Materials and Rock Dusting

§ 75.400 Accumulation of combustible materials.

[STATUTORY PROVISION]

Coal dust, including float coal dust deposited on rock-dusted surfaces, loose coal, and other combustible materials, shall be cleaned up and not be permitted to accumulate in active workings, or on electric equipment therein.

§ 75.400-1 Definitions.

(a) The term "coal dust" means particles of coal that can pass a No. 20 sieve.

(b) The term "float coal dust" means the coal dust consisting of particles of coal that can pass a No. 200 sieve.

(c) The term "loose coal" means coal fragments larger in size than coal dust.

§ 75.400-2 Cleanup program.

A program for regular cleanup and removal of accumulations of coal and float coal dusts, loose coal, and other combustibles shall be established and maintained. Such program shall be available to the Secretary or authorized representative.

§ 75.401 Abatement of dust; water or water with a wetting agent.

[STATUTORY PROVISION]

Where underground mining operations in active workings create or raise excessive amounts of dust, water or water with a wetting agent added to it, or other no less effective methods approved by the Secretary or his authorized representative, shall be used to abate such dust. In working places, particularly in distances less than 40 feet from the face, water, with or without a wetting agent, or other no less effective methods approved by the Secretary or his authorized representative, shall be applied to coal dust on the ribs, roof, and floor to reduce dispersibility and to minimize the explosion hazard.

§ 75.401-1 Excessive amounts of dust.

The term "excessive amounts of dust" means coal and float coal dust in the air in such amounts as to create the potential of an explosion hazard.

§ 75.402 Rock dusting.

[STATUTORY PROVISION]

All underground areas of a coal mine, except those areas in which the dust is too wet or too high in incombustible content to propagate an explosion, shall be rock dusted to within 40 feet of all working faces, unless such areas are inaccessible or unsafe to enter or unless the Secretary or his authorized representative permits an exception upon his finding that such exception will not pose a hazard to the miners. All crosscuts that are less than 40 feet from a working face shall also be rock dusted.

§ 75.402-1 Definition.

The term "too wet" means that sufficient natural moisture is retained by the dust that when a ball of finely divided material is squeezed in the hands water is exuded.

§ 75.402-2 Exceptions.

Exceptions granted under § 75.402 by the Secretary or his authorized representative shall be reviewed periodically.

§ 75.403 Maintenance of incombustible content of rock dust.

[STATUTORY PROVISION]

Where rock dust is required to be applied, it shall be distributed upon the top, floor, and sides of all underground areas of a coal mine and maintained in such quantities that the incombustible content of the combined coal dust, rock dust, and other dust shall be not less than 65 per centum, but the incombustible content in the return aircourses shall be no less than 80 per centum. Where methane is present in any ventilating current, the per centum of incombustible content of such combined dusts shall be increased 1.0 and 0.4 per centum for each 0.1 per centum of methane where 65 and 80 per centum, respectively, of incombustibles are required.

§ 75.403-1 Incombustible content.

Moisture contained in the combined coal dust, rock dust and other dusts shall be considered as a part of the incombustible content of such mixture.

§ 75.404 Exemption of anthracite mines.

[STATUTORY PROVISION]

Sections 75.401, 75.402, and 75.403 shall not apply to underground anthracite mines.

Subpart F—Electrical Equipment—General

§ 75.500 Permissible electric equipment.

[STATUTORY PROVISION]

On and after March 30, 1971:

(a) All junction or distribution boxes used for making multiple power connections inby the last open crosscut shall be permissible;

(b) All handheld electric drills, blower and exhaust fans, electric pumps, and such other low horsepower electric face equipment as the Secretary may designate on or before May 30, 1970, which are taken into or used inby the last open crosscut of any coal mine shall be permissible;

(c) All electric face equipment which is taken into or used inby the last open crosscut of any coal mine classified under any provision of law as gassy prior to March 30, 1970, shall be permissible; and

(d) All other electric face equipment which is taken into or used inby the last crosscut of any coal mine, except a coal mine referred to in § 75.501, which has not been classified under any provision of law as a gassy mine prior to March 30, 1970, shall be permissible.

§ 75.500-1 Other low horsepower electric face equipment.

Other low horsepower electric face equipment designated pursuant to the provisions of § 75.500(b) is all other electric-driven mine equipment, except low horsepower rock dusting equipment, and employs an electric current supplied by either a power conductor or battery and consumes not more than 2,250 watts of electricity and which is taken into or used inby the last open crosscut.

§ 75.501 Permissible electric face equipment; coal seams above water table.

[STATUTORY PROVISION]

On and after March 30, 1974, all electric face equipment, other than equipment referred to in paragraph (b) of § 75.500, which is taken into and used inby the last open crosscut of any coal mine which is operated entirely in coal seams located above the water table and which has not been classified under any provision of law as a gassy mine prior to March 30, 1970, and in which one or more openings were made prior to December 30, 1969, shall be permissible.

§ 75.501-1 Coal seams above the water table.

As used in § 75.501, the phrase "coal seams above the water table" means coal seams in a mine which are located at an elevation above a river or the tributary of a river into which a local surface water system naturally drains.

§ 75.501-2 Permissible electric face equipment.

(a) On and after March 30, 1971, in mines operated entirely in coal seams which are located at elevations above the water table:

(1) All junction or distribution boxes used for making multiple power connections inby the last open crosscut shall be permissible; and

(2) All handheld electric drills, blower and exhaust fans, electric pumps, and all other electric-driven mine equipment, except low horsepower rock dusting equipment, that employs an electric current supplied by either a power conductor or battery and consumes not more than 2,250 watts of electricity, which is taken into or used inby the last open crosscut shall be permissible.

(b) On and after March 30, 1974, in mines operated entirely in coal seams which are located at elevations above the water table, all electric face equipment which is taken into or used inby the last crosscut shall be permissible.

§ 75.501-3 New openings; mines above water table and never classed gassy.

(a) Where a new opening(s) is proposed to be developed by shaft, slope, or drift from the surface to, or in, any coalbed and the operator considers such proposed new opening(s) to be a part of a mine coming under section 305(a)(2) of the Act and § 75.501 the operator shall so notify the District Manager for the District in which the mine is located in writing prior to the date any actual development (in coal) through such opening(s) is undertaken. Such notification shall include the following information:

(1) Name, address, and identification number of the existing mine.

(2) A current map of the existing mine clearly setting out the proposed new opening(s), mining plan and planned interconnection, if any, with existing workings.

(3) A statement as to when the operator obtained the right to mine the coal which the proposed new opening(s) will traverse.

(4) The name of the coalbeds currently being mined and those which the new opening(s) will traverse.

(5) The expected life of the mine.

(6) The reason(s) for the proposed new opening(s) (for example, haulage,

ventilation, drainage, to avoid bad roof, escapeway).

The District Manager shall require submission of any additional information he considers pertinent.

(b) The District Manager shall make a determination based on all of the information submitted by the operator as to whether the proposed new opening(s) will be considered as a part of the existing mine or as a new mine. The following guidelines and criteria shall be used by the District Manager in making his determination:

(1) The effect that the proposed new opening(s) will have on the safety of the men working in the existing mine shall be considered of primary importance.

(2) Whether the operator had a right to mine the coal which the proposed new openings will traverse prior to the date of enactment of the Act (December 30, 1969) and whether the original mining plan included mining such coal.

(3) Whether, in accordance with the usual mining practices common to the particular district, the proposed new openings would have been considered a new mine or part of the existing mine. A number of factors will be considered including, but not limited to:

(i) The relationship between the coalbeds currently being mined, and those proposed to be mined;

(ii) The distance between existing openings and the proposed new opening(s);

(iii) The projected time elapsing between the start of the new opening(s) and planned interconnection, if any, with the existing mine; and

(iv) The projected tonnage of coal which is expected to be mined prior to interconnection where interconnection is planned.

The District Manager shall notify the operator in writing within 30 days of receiving all of the information, required and requested, of his determination. No informal notification shall be given.

(c) All new opening(s) shall be operated as a new mine prior to receiving a written notification from the District Manager that such new opening(s) will be considered part of an existing mine coming under section 305(a)(2) of the Act and § 75.501.

(d) Nothing in this § 75.501-3 shall be construed to relieve the operator from compliance with any of the mandatory standards contained in this Part 75.

[37 FR 8949, May 3, 1972]

§ 75.502 Permits for noncompliance.

An operator need not comply with paragraph (d) of § 75.500 or with § 75.501 during the period of time specified in a permit issued by the Interim Compliance Panel established by the Act.

§ 75.503 Permissible electric face equipment; maintenance.

[STATUTORY PROVISIONS]

The operator of each coal mine shall maintain in permissible condition all electric face equipment required by §§ 75.500, 75.501, 75.504 to be permissible which is taken into or used inby the last open crosscut of any such mine.

§ 75.503-1 Statement listing all electric face equipment.

Each operator of a coal mine shall complete and file Mine Safety and Health Administration Form No. 6-1496 entitled "Coal Operator's Electrical Survey" and Form 6-1496 Supplemental entitled "Operator's Survey of Electrical Face Equipment." Forms may be obtained from any Coal Mine Safety District Office or Subdistrict Office of the Mine Safety and Health Administration. Separate forms shall be filed for each mine. Copies one and two of the completed form shall be filed with the Coal Mine District or Subdistrict Manager for the district in which each mine is located on or before May 30, 1970. An operator must list all electric face equipment being used at each mine as of the time of filing, all such equipment being repaired, and all standby electric equipment stored at or in the mine which the operator intends to use as face equipment.

§ 75.504 Permissibility of new, replacement, used, reconditioned, additional, and rebuilt electric face equipment.

On and after March 30, 1971, all new, replacement, used, reconditioned, and additional electric face equipment used in any mine referred to in §§ 75.500, 75.501, and 75.503 shall be permissible and shall be maintained in a permissible condition, and in the event of any major overhaul of any item of electric face equipment in use on or after March 30, 1971, such equipment shall be put in, and thereafter maintained in, a permissible condition, unless in the opinion of the Secretary, such equipment or necessary replacement parts are not available.

[38 FR 4975, Feb. 23, 1973]

§ 75.505 Mines classed gassy; use and maintenance of permissible electric face equipment.

[STATUTORY PROVISION]

Any coal mine which, prior to March 30, 1970, was classed gassy under any provision of law and was required to use permissible electric face equipment and to maintain such equipment in a permissible condition shall continue to use such equipment and to maintain such equipment in such condition.

§ 75.506 Electric face equipment; requirements for permissibility.

(a) Electric-driven mine equipment and accessories manufactured on or after March 30, 1973, will be permissible electric face equipment only (1) if they are fabricated, assembled, or built under an approval, or any extension thereof, issued by the Bureau of Mines or the Mine Safety and Health Administration in accordance with schedule 2G, or any subsequent Bureau of Mines schedule promulgated by the Secretary after March 30, 1970, which amends, modifies, or supersedes the permissibility requirements of schedule 2G, and (2) if they are maintained in a permissible condition.

(b) Except as provided in paragraph (c) of this § 75.506 electric-driven mine equipment and accessories manufactured prior to March 30, 1973, will be permissible electric face equipment (1) if they were fabricated, assembled, or built under an approval, or any extension thereof, issued by the Bureau of Mines in accordance with the schedules set forth below, and (2) if they are maintained in a permissible condition.

Bureau of Mines Schedule 2D, May 23, 1936;
Bureau of Mines Schedule 2E, February 15, 1945;
Bureau of Mines Schedule 2F, August 3, 1955; and
Bureau of Mines Schedule 2G, March 19, 1968.

Copies of these schedules are available at all Coal Mine Safety District and Subdistrict Offices of the Bureau of Mines.

(c) Electric driven mine equipment and accessories bearing the Bureau of Mines approval numbers listed in Appendix A to this subpart are permissible electric face equipment only if they are maintained in a permissible condition.

(d) Electric cap lamps, electric mine lamps other than standard cap lamps, flame safety lamps, portable methane detectors, telephones and signaling devices, single- and multiple-shot blasting units, lighting equipment for illuminating underground mines, and methane-monitoring systems will be permissible electric face equipment only (1) if they are approved under the appropriate Bureau of Mines schedule applicable to such equipment and (2) if they are in permissible condition. The Bureau of Mines schedules referred to, dates issued, and the appropriate parts of this chapter are:

Electric Cap Lamps, Bureau of Mines Schedule 6D, August 26, 1939 (Part 19);
Electric Mine Lamps Other than Standard Cap Lamps, Bureau of Mines Schedule 10C, May 17, 1938 (Part 20);
Flame Safety Lamps, Bureau of Mines Schedule 7C, August 30, 1935 (Part 21);
Portable Methane Detectors, Bureau of Mines Schedule 8C, October 31, 1935 (Part 22);
Telephone and Signaling Devices, Bureau of Mines Schedule 9B, October 25, 1938 (Part 23);
Single Shot Blasting Units, Bureau of Mines Schedule 12D, November 27, 1945 (Part 24);
Multiple Shot Blasting Units, Bureau of Mines Schedule 16E, May 19, 1960 (Part 25);

Lighting Equipment for Illuminating Underground Workings. Bureau of Mines Schedule 29A. December 2, 1958 (Part 26); and

Methane-Monitoring Systems. Bureau of Mines Schedule 32A. July 27, 1966 (Part 27).

§ 75.506-1 Electric face equipment; permissible condition; maintenance requirements.

(a) Except as provided in paragraph (b) of this section, electric face equipment which meets the requirements for permissibility set forth in § 75.506 will be considered to be in permissible condition only if it is maintained so as to meet the requirements for permissibility set forth in the Bureau of Mines schedule under which such electric face equipment was initially approved, or, if the equipment has been modified, it is maintained so as to meet the requirements of the schedule under which such modification was approved.

(b) Electric face equipment bearing the Bureau of Mines approval number listed in Appendix A of this subpart will be considered to be in permissible condition only if it is maintained so as to meet the requirements for permissibility set forth in Bureau of Mines Schedule 2D or, if such equipment has been modified, it is maintained so as to meet the requirements of the schedule under which the modification was approved.

(c) Notwithstanding the provisions of paragraphs (a) and (b) of this section, where the minimum requirements for permissibility set forth in the appropriate Bureau of Mines schedule under which such equipment or modifications were approved have been superseded by the requirements of this Part 75, the latter requirements shall be applicable.

§ 75.507 Power connection points.

[STATUTORY PROVISIONS]

Except where permissible power connection units are used, all power-connection points outby the last open crosscut shall be in intake air.

§ 75.507-1 Electric equipment other than power-connection points; outby the last open crosscut; return air; permissibility requirements.

(a) All electric equipment, other than power-connection points, used in return air outby the last open crosscut in any coal mine shall be permissible except as provided in paragraphs (b) and (c) of this section.

(b) Notwithstanding the provisions of paragraph (a) of this section, in any coal mine where nonpermissible electric face equipment may be taken into or used inby the last open crosscut until March 30, 1974, such nonpermissible electric face equipment may be used in return air outby the last open crosscut.

(c) Notwithstanding the provisions of paragraph (a) of this section, in any coal mine where a permit for noncompliance is in effect, nonpermissible electric face equipment specified in such permit for noncompliance may be used in return air outby the last open crosscut for the duration of such permit.

[38 FR 4975, Feb. 23, 1973]

§ 75.508 Map of electrical system.

[STATUTORY PROVISIONS]

The location and the electrical rating of all stationary electric apparatus in connection with the mine electric system, including permanent cables, switchgear, rectifying substations, transformers, permanent pumps, and trolley wires and trolley feeder wires, and settings of all direct-current circuit breakers protecting underground trolley circuits, shall be shown on a mine map. Any changes made in a location, electric rating, or setting shall be promptly shown on the map when the change is made. Such map shall be available to an authorized representative of the Secretary and to the miners in such mine.

§ 75.508-1 Mine tracks.

When mine track is used as a conductor of a trolley system, the location of such track shall be shown on the map required by § 75.508, with a notation of the number of rails and the size of such track expressed in pounds per yard.

§ 75.508-2 Changes in electric system map; recording.

Changes made in the location, electrical rating or setting within the mine electrical system shall be recorded on the map of such system no later than the end of the next workday following completion of such changes.

§ 75.509 Electric power circuit and electric equipment; deenergization.

[STATUTORY PROVISIONS]

All power circuits and electric equipment shall be deenergized before work is done on such circuits and equipment, except when necessary for trouble shooting or testing.

§ 75.510 Energized trolley wires; repair.

[STATUTORY PROVISIONS]

Energized trolley wires may be repaired only by a person trained to perform electrical work and to maintain electrical equipment and the operator of a mine shall require that such person wear approved and tested insulated shoes and wireman's gloves.

§ 75.510-1 Repair of energized trolley wires; training.

The training referred to in § 75.510 must include training in the repair and maintenance of live trolley wires, and in the hazards involved in making such repairs, and in the limitations of protective clothing used to protect against such hazards.

§ 75.511 Low-, medium-, or high-voltage distribution circuits and equipment; repair.

[STATUTORY PROVISION]

No electrical work shall be performed on low-, medium-, or high-voltage distribution circuits or equipment, except by a qualified person or by a person trained to perform electrical work and to maintain electrical equipment under the direct supervision of a qualified person. Disconnecting devices shall be locked out and suitably tagged by the persons who perform such work, except that in cases where locking out is not possible, such devices shall be opened and suitably tagged by such persons. Locks or tags shall be removed only by the persons who installed them or, if such persons are unavailable, by persons authorized by the operator or his agent.

§ 75.511-1 Qualified person.

To be a qualified person within the meaning of § 75.511, an individual must meet the requirements of § 75.153.

§ 75.512 Electric equipment; examination, testing and maintenance.

[STATUTORY PROVISION]

All electric equipment shall be frequently examined, tested, and properly maintained by a qualified person to assure safe operating conditions. When a potentially dangerous condition is found on electric equipment, such equipment shall be removed from service until such condition is corrected. A record of such examinations shall be kept and made available to an authorized representative of the Secretary and to the miners in such mine.

OMB CONTROL No. 1219-0067. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.512-1 Qualified person.

To be a qualified person within the meaning of § 75.512, an individual must meet the requirements of § 75.153.

§ 75.512-2 Frequency of examinations.

The examinations and tests required by § 75.512 shall be made at least weekly. Permissible equipment shall be examined to see that it is in permissible condition.

§ 75.513 Electric conductor; capacity and insulation.

[STATUTORY PROVISION]

All electric conductors shall be sufficient in size and have adequate current carrying capacity and be of such construction that a rise in temperature resulting from normal operation will not damage the insulating materials.

§ 75.513-1 Electric conductor; size.

An electric conductor is not of sufficient size to have adequate carrying capacity if it is smaller than is provided for in the National Electric Code, 1968. In addition, equipment and trailing cables that are required to be permissible must meet the requirements of the appropriate schedules of the Bureau of Mines.

§ 75.514 Electrical connections or splices; suitability.

[STATUTORY PROVISION]

All electrical connections or splices in conductors shall be mechanically and electrically efficient, and suitable connectors shall be used. All electrical connections or splices in insulated wire shall be reinsulated at least to the same degree of protection as the remainder of the wire.

§ 75.515 Cable fittings; suitability.

[STATUTORY PROVISION]

Cables shall enter metal frames of motors, splice boxes, and electric compartments only through proper fittings. When insulated wires other than cables pass through metal frames, the holes shall be substantially bushed with insulated bushings.

§ 75.516 Power wires; support.

[STATUTORY PROVISION]

All power wires (except trailing cables on mobile equipment, specially designed cables conducting high-voltage power to underground rectifying equipment or transformers, or bare or insulated ground and return wires) shall be supported on well-insulated insulators and shall not contact combustible material, roof, or ribs.

§ 75.516-1 Installed insulators.

Well-insulated insulators is interpreted to mean well-installed insulators. Insulated J-hooks may be used to suspend insulated power cables for temporary installation not exceeding 6 months and for permanent installation of control cables such as may be used along belt conveyors.

§ 75.516-2 Communication wires and cables; installation; insulation; support.

(a) All communication wires shall be supported on insulated hangers or insulated J-hooks.

(b) All communication cables shall be insulated as required by § 75.517-1, and shall either be supported on insulated or uninsulated hangers or J-hooks, or securely attached to messenger wires, or buried, or otherwise protected against mechanical damage in a manner approved by the Secretary or his authorized representative.

(c) All communication wires and cables installed in track entries shall, except when a communication cable is buried in accordance with paragraph (b) of this section, be installed on the side of the entry opposite to trolley wires and trolley feeder wires. Additional insulation shall be provided for communication circuits at points where they pass over or under any power conductor.

(d) For purposes of this section, communication cable means two or more insulated conductors covered by an additional abrasion-resistant covering.

[38 FR 4975, Feb. 23, 1973]

§ 75.517 Power wires and cables; insulation and protection.

[STATUTORY PROVISIONS]

Power wires and cables, except trolley wires, trolley feeder wires, and bare signal wires, shall be insulated adequately and fully protected.

§ 75.517-1 Power wires and cables; insulation and protection.

Power wires and cables installed on or after March 30, 1970, shall have insulation with a dielectric strength at least equal to the voltage of the circuit.

§ 75.517-2 Plans for insulation of existing bare power wires and cables.

(a) On or before December 31, 1970, plans for the insulation of existing bare power wires and cables installed prior to March 30, 1970, shall be filed with the District Manager of the Coal

Mine Safety District in which the mine is located to permit approval and prompt implementation of such plans.

(b) The appropriate District Manager shall notify the operator in writing of the approval of a proposed insulation plan. If revisions are required for approval, the changes required will be specified.

(c) An insulation plan shall include the following information:

(1) Name and address of the company, the mine and the responsible officials;

(2) Map or diagram indicating location of power wires and cables required to be insulated;

(3) Total length of bare power wires and cables required to be insulated;

(4) Schedule for the replacement or insulation of bare power wires and cables;

(5) Type of insulation to be used and the voltage rating as indicated by the manufacturer.

(d) The District Manager shall be guided by the following criteria in approving insulation plans on a mine-by-mine basis. Insulation not conforming to these criteria may be approved provided the operator can satisfy the Mine Safety and Health Administration that the insulation will provide no less than the same measure of protection.

(1) Insulation shall be adequate for the applied voltage of the circuit.

(2) When tubing is used to insulate existing power wires and cables, it shall have a dielectric strength at least equal to the voltage of the circuit. When the tubing is split for purposes of installation, the joints shall be effectively sealed. The butt ends may be sealed with a moisture resistant insulating tape.

(3) When tape is used to insulate existing power wires and cables, it shall be applied half-lapped and one thickness of the tape shall have a dielectric strength at least equal to the voltage of the circuit. The tape shall be self-adhesive and moisture resistant.

§ 75.518 Electric equipment and circuits; overload and short circuit protection.

[STATUTORY PROVISION]

Automatic circuit-breaking devices or fuses of the correct type and capacity shall be installed so as to protect all electric equipment and circuits against short circuit and overloads. Three-phase motors on all electric equipment shall be provided with overload protection that will deenergize all three phases in the event that any phase is overloaded.

§ 75.518-1 Electric equipment and circuits; overload and short circuit protection; minimum requirements.

A device to provide either short circuit protection or protection against overload which does not conform to the provisions of the National Electric Code, 1968, does not meet the requirement of § 75.518. In addition, such devices on electric face equipment and trailing cables that are required to be permissible must meet the requirements of the applicable schedules of the Bureau of Mines.

§ 75.518-2 Incandescent lamps, overload and short circuit protection.

Incandescent lamps installed along haulageways and at other locations, not contacting combustible material, and powered from trolley or direct current feeder circuits, need not be provided with separate short circuit or overload protection, if the lamp is not more than 8 feet in distance from such circuits.

§ 75.519 Main power circuits; disconnecting switches.

[STATUTORY PROVISION]

In all main power circuits, disconnecting switches shall be installed underground within 500 feet of the bottoms of shafts and boreholes through which main power circuits enter the underground area of the mine and within 500 feet of all other places where main power circuits enter the underground area of the mine.

§ 75.519-1 Main power circuits; disconnecting switches; locations.

Section 75.519 requires (a) that a disconnecting switch be installed on the surface at a point within 500 feet of the place where the main power circuit enters the underground area of a mine, and (b) that, in an instance on which a main power circuit enters the underground area through a shaft or borehole, a disconnecting switch be installed underground within 500 feet of the bottom of the shaft or borehole.

§ 75.520 Electric equipment; switches.

[STATUTORY PROVISION]

All electric equipment shall be provided with switches or other controls that are safely designed, constructed, and installed.

§ 75.521 Lightning arresters; ungrounded and exposed power conductors and telephone wires.

Each ungrounded, exposed power conductor and each ungrounded, exposed telephone wire that leads underground shall be equipped with suitable lightning arresters of approved type within 100 feet of the point where the circuit enters the mine. Lightning arresters shall be connected to a low resistance grounding medium on the surface which shall be separated from neutral grounds by a distance of not less than 25 feet.

[38 FR 4975, Feb. 23, 1973]

§ 75.522 Lighting devices.

[STATUTORY PROVISION]

No device for the purpose of lighting any coal mine which has not been approved by the Secretary or his authorized representative shall be permitted in such mine.

§ 75.522-1 Incandescent and fluorescent lamps.

(a) Except for areas of a coal mine inby the last open crosscut, incandescent lamps may be used to illuminate underground areas. When incandescent lamps are used in a track entry or belt entry or near track entries to illuminate special areas other than structures, the lamps shall be installed in weather-proof sockets located in positions such that the lamps will not come in contact with any combustible material. Lamps used in all other places must be of substantial construction and be fitted with a glass enclosure.

(b) Incandescent lamps within glass enclosures or fluorescent lamps may be used inside underground structures (except magazines used for the storage of explosives and detonators). In underground structures lighting circuits shall consist of cables installed on insulators or insulated wires installed in metallic conduit or metallic armor.

§ 75.523 Electric face equipment; deenergization.

[STATUTORY PROVISION]

An authorized representative of the Secretary may require in any mine that electric face equipment be provided with devices that will permit the equipment to be deenergized quickly in the event of an emergency.

§ 75.523-1 Deenergization of self-propelled electric face equipment installation requirements.

(a) Except as provided in paragraphs (b) and (c) of this section, all self-propelled electric face equipment which is used in the active workings of each underground coal mine on and after March 1, 1973, shall, in accordance with the schedule of time specified in paragraphs (a) (1) and (2) of this section, be provided with a device that will quickly deenergize the tramming motors of the equipment in the event of an emergency. The requirements of this paragraph (a) shall be met as follows:

(1) On and after December 15, 1974, for self-propelled cutting machines, shuttle cars, battery-powered machines, and roof drills and bolters;

(2) On and after February 15, 1975, for all other types of self-propelled electric face equipment.

(b) Self-propelled electric face equipment that is equipped with a substantially constructed cab which meets the requirements of this part, shall not be required to be provided with a device that will quickly deenergize the tram-

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ming motors of the equipment in the event of an emergency.

(c) An operator may apply to the Director of Technical Support, Mine Safety and Health Administration, Department of Labor, 4015 Wilson Boulevard, Arlington, Va. 22203 for approval of the installation of devices to be used in lieu of devices that will quickly deenergize the tramming motors of self-propelled electric face equipment in the event of an emergency. The Director of Technical Support may approve such devices if he determines that the performance thereof will be no less effective than the performance requirements specified in § 75.523-2.

[38 FR 3407, Feb. 6, 1973, as amended at 39 FR 27557, July 30, 1974; 43 FR 12320, Mar. 24, 1978; 47 FR 28096, June 29, 1982]

§ 75.523-2 Deenergization of self-propelled electric face equipment; performance requirements.

(a) Deenergization of the tramming motors of self-propelled electric face equipment, required by paragraph (a) of § 75.523-1, shall be provided by:

(1) Mechanical actuation of an existing pushbutton emergency stopswitch,

(2) Mechanical actuation of an existing lever emergency stopswitch, or

(3) The addition of a separate electromechanical switch assembly.

(b) The existing emergency stopswitch or additional switch assembly shall be actuated by a bar or lever which shall extend a sufficient distance in each direction to permit quick deenergization of the tramming motors of self-propelled electric face equipment from all locations from which the equipment can be operated.

(c) Movement of not more than 2 inches of the actuating bar or lever resulting from the application of not more than 15 pounds of force upon contact with any portion of the equipment operator's body at any point along the length of the actuating bar or lever shall cause deenergization of the tramming motors of the self-propelled electric face equipment.

[38 FR 3406, Feb. 6, 1973; 38 FR 4394, Feb. 14, 1973]

§ 75.523-3 Rubber-tired, self-propelled electric face equipment; automatic emergency brake; installation and performance requirements.

(a) Except as provided in paragraph (c) of this section, all rubber-tired, self-propelled electric face equipment which is used in the active workings of each underground coal mine on and after March 1, 1973, shall, in accordance with the schedule of time specified in paragraph (a) (1) and (2) of this section be provided with an automatic emergency brake. The requirements of this paragraph (a) shall be met as follows:

(1) On and after December 31, 1973, for rubber-tired, self-propelled cutting machines, shuttle cars, battery-powered machines, and roof drills and bolters;

(2) On and after March 31, 1974, for all other types of rubber-tired, self-propelled electric face equipment.

(b) The emergency brake required by paragraph (a) of this section shall automatically engage when either:

(1) The device to deenergize the equipment, required by § 75.523-1, is activated; or

(2) The equipment is otherwise deenergized. The automatic emergency brake shall engage immediately; bring the equipment to a complete stop within at least the same distance as the service brakes; and, prevent movement of the equipment while engaged.

(c) Rubber-tired, self-propelled electric face equipment with a driving mechanism, in accordance with § 18.20(f) of this chapter, that precludes movement of the equipment when parked, shall not be required to be provided with an automatic emergency brake as is described in paragraph (a) of this section.

[38 FR 3407, Feb. 6, 1973]

NOTE: The dates specified in paragraphs (a) (1) and (2) of this section were indefinitely suspended at 39 FR 27558, July 30, 1974.

§ 75.524 Electric face equipment; electric equipment used in return air outby the last open crosscut; maximum level of alternating or direct electric current between frames of equipment.

The maximum level of alternating or direct electric current that exists between the frames of any two units of electric face equipment that come in contact with each other in the working places of a coal mine, or between the frames of any two units of electric equipment that come in contact with each other in return air outby the last open crosscut, shall not exceed one ampere as determined from the voltage measured across a 0.1 ohm resistor connected between the frames of such equipment.

[38 FR 29998, Oct. 31, 1973]

APPENDIX A—LIST OF PERMISSIBLE ELECTRIC FACE EQUIPMENT APPROVED BY THE BUREAU OF MINES PRIOR TO MAY 23, 1936

Motor-Driven Mine Equipment

(Approved Under Schedules 2, 2A, 2B, and 2C)

Approval No.	Date
AIR COMPRESSORS	
128	March 21, 1927.
128A	July 16, 1926.
COAL DRILLS AND DRILLING MACHINES	
Hand Drills	
109	September 19, 1922.
154	August 1, 1928.
184	February 7, 1930.
227	July 29, 1931.
254	July 15, 1933.
Post Drills	
119	April 15, 1925.
119A	Do.
225	July 10, 1931.
225A	Do.
228	August 12, 1931.
228A	February 17, 1932.
230	August 20, 1931.
230A	Do.
237	December 1, 1931.
237A	Do.
Drilling Machines	
147	February 8, 1928.
147A	Do.
176	September 9, 1929.
176A	Do.

APPENDIX A—LIST OF PERMISSIBLE ELECTRIC FACE EQUIPMENT APPROVED BY THE BUREAU OF MINES PRIOR TO MAY 23, 1936—Continued

Motor-Driven Mine Equipment

(Approved Under Schedules 2, 2A, 2B, and 2C)

Approval No.	Date
LOADING AND CONVEYING EQUIPMENT	
LOADING MACHINES	
Unmounted Type	
122	January 8, 1926.
122A	Do.
Caterpillar-Mounted Type	
150	May 11, 1928.
186	March 15, 1930.
222	May 8, 1931.
222A	July 28, 1931.
229	August 17, 1931.
229A	Do.
235	November 27, 1931.
235A	October 29, 1931.
278	January 17, 1935.
278A	Do.
283A	March 12, 1935.
284A	Do.
285A	Do.
294	September 18, 1935.
300A	May 6, 1936.
127	July 16, 1926.
127A	September 23, 1927.
Track-Mounted Type	
194	June 6, 1930.
194A	Do.
217	February 27, 1931.
217A	Do.
276	January 11, 1935.
277	January 17, 1935.
282A	March 12, 1935.
291A	July 3, 1935.
Pit-Car Loaders	
167	March 27, 1929.
167A	Do.
175	July 26, 1929.
175A	June 24, 1929.
250	December 10, 1932.
250A	Do.
252A	February 20, 1933.
CONVEYORS	
Belt Type	
236	November 19, 1931.
287A	March 12, 1935.
296A	January 6, 1936.
Chain Type	
151	May 19, 1928.
209	December 2, 1930.
240	March 12, 1932.
240A	Do.
298A	March 3, 1936.

APPENDIX A—LIST OF PERMISSIBLE ELECTRIC FACE EQUIPMENT APPROVED BY THE BUREAU OF MINES PRIOR TO MAY 23, 1936—Continued

Motor-Driven Mine Equipment

(Approved Under Schedules 2, 2A, 2B, and 2C)

Approval No.	Date
Power Units for Conveyors	
265	February 12, 1934.
265A	March 19, 1934.
390A	March 23, 1934.
Shaker Type	
247	October 21, 1932.
257A	August 11, 1933.
262A	December 8, 1933.
271	May 20, 1935.
271A	October 17, 1934.
274A	December 13, 1934.
286A	March 12, 1935.
295	September 20, 1935.
299A	April 9, 1936.
Scraper-type Loaders	
138	August 5, 1927.
138A	Do.
196	September 29, 1930.
196A	July 26, 1930.
226	July 27, 1931.
255	July 31, 1933.
256	Do.

MINING MACHINES, MACHINERY-MOVING EQUIPMENT, MISCELLANEOUS TRUCKS, AND WATER SPRAY SUPPLY UNITS

MINING MACHINES

Shortwall Machines

Approval No.	Date
103	November 2, 1917.
103A	Do.
105	February 9, 1922.
105A	Do.
106	Do.
106A	Do.
107	Do.
107A	Do.
108	Do.
108A	Do.
111	October 16, 1922.
111A	Do.
113	November 4, 1924.
113A	Do.
114	February 7, 1925.
114A	Do.
115	Do.
115A	Do.
153	July 31, 1928.
153A	Do.
193	June 3, 1930.
193A	Do.
197	July 31, 1930.
197A	Do.
198	August 1, 1930.
198A	Do.
201	September 8, 1930.
201A	Do.

APPENDIX A—LIST OF PERMISSIBLE ELECTRIC FACE EQUIPMENT APPROVED BY THE BUREAU OF MINES PRIOR TO MAY 23, 1936—Continued

Motor-Driven Mine Equipment

(Approved Under Schedules 2, 2A, 2B, and 2C)

Approval No.	Date
204	October 13, 1930.
204A	December 13, 1930.
223	May 13, 1931.
223A	Do.
241	March 18, 1932.
241A	Do.
258	August 15, 1933.
259A	August 16, 1933.
260A	August 17, 1933.
273	November 30, 1934.
288	March 27, 1935.
288A	Do.
292	September 11, 1935.
292A	Do.
293A	Do.
Longwall Machines	
185	February 24, 1930.
185A	Do.
218	March 10, 1931.
218A	Do.
246	August 19, 1932.
246A	Do.
261	September 12, 1933.
Track or caterpillar mounted	
112	March 13, 1924.
112A	Do.
118	March 12, 1925.
118A	Do.
125	April 26, 1926.
125A	Do.
172	April 30, 1929.
172A	Do.
188	April 15, 1930.
188A	Do.
207	November 14, 1930.
207A	Do.
216	February 12, 1931.
216A	Do.
231	August 31, 1931.
231A	Do.
242	April 7, 1932.
244	June 18, 1932.
244A	September 20, 1932.
253A	February 25, 1933.
267	June 27, 1934.
268A	July 25, 1934.
269A	September 24, 1934.
280A	March 4, 1935.
297	January 27, 1936.
297A	Do.
Mine Pumps	
140	November 1, 1927.
140A	Do.
143	Do.
143A	Do.
144	Do.

APPENDIX A—LIST OF PERMISSIBLE ELECTRIC FACE EQUIPMENT APPROVED BY THE BUREAU OF MINES PRIOR TO MAY 23, 1936—Continued

Motor-Driven Mine Equipment

(Approved Under Schedules 2, 2A, 2B, and 2C)

Approval No.	Date
144A	November 1, 1927.
199	August 18, 1930.
199A	Do.
208	November 29, 1930.
210	December 15, 1930.
210A	Do.
211	December 17, 1930.
211A	Do.
213	December 29, 1930.
213A	Do.
214	January 2, 1931.
214A	Do.
215	Do.
215A	Do.
248	October 31, 1932.
248A	November 23, 1932.
264	January 31, 1934.
264A	Do.
272	October 23, 1934.
272A	Do.

Rock-Dusting Machines

130	November 5, 1926.
137	July 2, 1927.
146	January 20, 1928.
146A	April 3, 1928.
180	October 30, 1929.
180A	January 17, 1930.
206	November 12, 1930.
279	February 14, 1935.

Room and Car-Spotting Hoists

116	February 13, 1925.
116A	Do.
164	January 21, 1931.
164A	Do.
165	Do.
165A	Do.
169	April 5, 1929.
169A	February 26, 1934.
190	April 20, 1930.
251A	January 16, 1933.
263	January 11, 1934.
266A	February 27, 1934.

STORAGE-BATTERY LOCOMOTIVES AND POWER TRUCKS

(Approved under Schedules 15, 2C, 2D, and 2E)

Gathering Locomotives

1501	October 11, 1921.
1502	November 13, 1922.
1503	March 24, 1923.
1505	April 5, 1924.
1507	August 20, 1925.
1508	March 21, 1925.
1509	September 25, 1925.
1511	November 10, 1925.
1512	November 11, 1925.
1513	February 25, 1926.
1516	December 28, 1926.

APPENDIX A—LIST OF PERMISSIBLE ELECTRIC FACE EQUIPMENT APPROVED BY THE BUREAU OF MINES PRIOR TO MAY 23, 1936—Continued

Motor-Driven Mine Equipment

(Approved Under Schedules 2, 2A, 2B, and 2C)

Approval No.	Date
1517	February 10, 1927.
1520	May 27, 1929.
1521	June 13, 1930.
1522	September 12, 1930.
1523	December 19, 1930.
1525	July 25, 1934.
1526	December 20, 1935.

Tandem Locomotive

1518	November 21, 1927.

Power Trucks

1506	May 5, 1924.
1505A	June 21, 1926.
1510C	December 31, 1926.
1514	December 18, 1926.
1515	December 28, 1926.
1512C	September 13, 1928.
1519C	April 6, 1929.
1524C	June 25, 1934.

JUNCTION, DISTRIBUTION, AND SPLICE BOXES

(Approved under Schedules 2D and 2E)

Junction Boxes

400	June 16, 1928.
400A	August 5, 1925.
401	May 11, 1927.
401A	Do.
402	Do.
402A	Do.
403	April 14, 1931.
403A	Do.
405A	December 4, 1933.

Subpart G—Trailing Cables

§ 75.600 Trailing cables; flame resistance.

[STATUTORY PROVISIONS]

Trailing cables used in coal mines shall meet the requirements established by the Secretary for flame-resistant cables.

§ 75.600-1 Approved cables; flame resistance.

The requirements for flame resistant cables are set forth in § 18.64 of this chapter (Bureau of Mines Schedule 2G).

§ 75.601 Short circuit protection of trailing cables.

[STATUTORY PROVISIONS]

Short circuit protection for trailing cables shall be provided by an automatic circuit breaker or other no less effective device approved by the Secretary of adequate current-interrupting capacity in each ungrounded conductor. Disconnecting devices used to disconnect power from trailing cables shall be plainly marked and identified and such devices shall be equipped or designed in such a manner that it can be determined by visual observation that the power is disconnected.

§ 75.601-1 Short circuit protection; ratings and settings of circuit breakers.

Circuit breakers providing short circuit protection for trailing cables shall be set so as not to exceed the maximum allowable instantaneous settings specified in this section; however, higher settings may be permitted by an authorized representative of the Secretary when he has determined that special applications are justified:

Conductor size AWG or MGM	Maximum allowable circuit breaker instantaneous setting (amperes)
14	50
12	75
10	150
8	200
6	300
4	500
3	600
2	800
1	1,000
1/0	1,250
2/0	1,500
3/0	2,000
4/0	2,500
250	2,500
300	2,500
350	2,500
400	2,500
450	2,500
500	2,500

§ 75.601-2 Short circuit protection; use of fuses; approval by the Secretary.

Fuses shall not be employed to provide short circuit protection for trailing cables unless specifically approved by the Secretary.

§ 75.601-3 Short circuit protection; dual element fuses; current ratings; maximum values.

Dual element fuses having adequate current-interrupting capacity shall meet the requirements for short circuit protection of trailing cables as provided in § 75.601, however, the current ratings of such devices shall not exceed the maximum values specified in this section:

Conductor size (AWG or MGM)	Single conductor cable		Two conductor cable	
	Ampacity	Max. fuse rating	Ampacity	Max. fuse rating
14			15	15
12			20	20
10			25	25
8	60	60	50	50
6	85	90	65	70
4	110	110	90	90
3	130	150	105	110
2	150	150	120	125
1	170	175	140	150
1/0	200	200	170	175
2/0	235	250	195	200
3/0	275	300	225	225
4/0	315	350	260	300
250	350	350	285	300
300	395	400	310	350
350	445	450	335	350
400	480	500	360	400
450	515	600	385	400
500	545	600	415	450

§ 75.602 Trailing cable junctions.

[STATUTORY PROVISION]

When two or more trailing cables junction to the same distribution center, means shall be provided to assure against connecting a trailing cable to the wrong size circuit breaker.

§ 75.603 Temporary splice of trailing cable.

[STATUTORY PROVISION]

One temporary splice may be made in any trailing cable. Such trailing cable may only be used for the next 24-hour period. No temporary splice shall be made in a trailing cable within 25 feet of the machine, except cable reel equipment. Temporary splices in trailing cables shall be made in a workmanlike manner and shall be mechanically strong and well insulated. Trailing cables or hand cables which have exposed wires or which have splices that heat or spark under load shall not be used. As used in this section, the term "splice" means the mechanical joining of one or more conductors that have been severed.

§ 75.604 Permanent splicing of trailing cables.

[STATUTORY PROVISIONS]

When permanent splices in trailing cables are made, they shall be:

(a) Mechanically strong with adequate electrical conductivity and flexibility;

(b) Effectively insulated and sealed so as to exclude moisture; and

(c) Vulcanized or otherwise treated with suitable materials to provide flame-resistant qualities and good bonding to the outer jacket.

§ 75.605 Clamping of trailing cables to equipment.

[STATUTORY PROVISIONS]

Trailing cables shall be clamped to machines in a manner to protect the cables from damage and to prevent strain on the electrical connections.

§ 75.606 Protection of trailing cables.

[STATUTORY PROVISIONS]

Trailing cables shall be adequately protected to prevent damage by mobile equipment.

§ 75.607 Breaking trailing cable and power cable connections.

[STATUTORY PROVISIONS]

Trailing cable and power cable connections to junction boxes shall not be made or broken under load.

Subpart H—Grounding

§ 75.700 Grounding metallic sheaths, armors, and conduits enclosing power conductors.

[STATUTORY PROVISIONS]

All metallic sheaths, armors, and conduits enclosing power conductors shall be electrically continuous throughout and shal. be grounded by methods approved by an authorized representative of the Secretary.

§ 75.700-1 Approved methods of grounding.

Metallic sheaths, armors and conduits in resistance grounded systems where the enclosed conductors are a part of the system will be approved if a solid connection is made to the neutral conductor; in all other systems, the following methods of grounding will be approved:

(a) A solid connection to a borehole casing having low resistance to earth;

(b) A solid connection to metal waterlines having low resistance to earth;

(c) A solid connection to a grounding conductor, other than the neutral conductor of a resistance grounded system, extending to a low resistance ground field located on the surface;

(d) Any other method of grounding, approved by an authorized representative of the Secretary, which ensures that there is no difference in potential between such metallic enclosures and the earth.

§ 75.701 Grounding metallic frames, casings, and other enclosures of electric equipment.

[STATUTORY PROVISIONS]

Metallic frames, casings, and other enclosures of electric equipment that can become "alive" through failure of insulation or by contact with energized parts shall be grounded by methods approved by an authorized representative of the Secretary.

§ 75.701-1 Approved methods of grounding of equipment receiving power from ungrounded alternating current power systems.

For purposes of grounding metallic frames, casings and other enclosures of equipment receiving power from ungrounded alternating current power systems, the following methods of grounding will be approved:

(a) A solid connection between the metallic frame, casing, or other metal enclosure and the grounded metallic sheath, armor, or conduit enclosing the power conductor feeding the electrical equipment enclosed;

(b) A solid connection to a borehole casing having low resistance to earth;

(c) A solid connection to metal waterlines having low resistance to earth;

(d) A solid connection to a grounding conductor extending to a low resistance ground field located on the surface;

(e) Any other method of grounding, approved by an authorized representative of the Secretary, which ensures that there is no difference in potential between such metal enclosures and the earth.

§ 75.701-2 Approved method of grounding metallic frames, casings and other enclosures receiving power from single-phase 110-220-volt circuit.

In instances where single-phase 110-220-volt circuits are used to feed electrical equipment, the only method of grounding that will be approved is the connection of all metallic frames, casings and other enclosures of such equipment to a separate grounding conductor which establishes a continuous connection to a grounded center tap of the transformer.

§ 75.701-3 Approved methods of grounding metallic frames, casings and other enclosures of electric equipment receiving power from direct current power systems with one polarity grounded.

For the purpose of grounding metallic frames, casings and enclosures of any electric equipment or device-receiving power from a direct-current power system with one polarity grounded, the following methods of grounding will be approved:

(a) A solid connection to the mine track;

(b) A solid connection to the grounded power conductor of the system;

(c) Silicon diode grounding; however, this method shall be employed only when such devices are installed in accordance with the requirements set forth in paragraph (d) of § 75.703-3; and

(d) Any other method, approved by an authorized representative of the Secretary, which insures that there is no difference in potential between such metal enclosures and the earth.

§ 75.701-4 Grounding wires; capacity of wires.

Where grounding wires are used to ground metallic sheaths, armors, conduits, frames, casings, and other metallic enclosures, such grounding wires will be approved if:

(a) The cross-sectional area (size) of the grounding wire is at least one-half the cross-sectional area (size) of the power conductor where the power conductor used is No. 6 A.W.G., or larger.

(b) Where the power conductor used is less than No. 6 A.W.G., the cross-sectional area (size) of the grounding wire is equal to the cross-sectional area (size) of the power conductor.

§ 75.701-5 Use of grounding connectors.

The attachment of grounding wires to a mine track or other grounded power conductor will be approved if separate clamps, suitable for such purpose, are used and installed to provide a solid connection.

§ 75.702 Protection other than grounding.

[STATUTORY PROVISIONS]

Methods other than grounding which provide no less effective protection may be permitted by the Secretary or his authorized representative.

§ 75.702-1 Protection other than grounding; approved by an authorized representative of the Secretary.

Under this subpart no method other than grounding may be used to ensure against a difference in potential between metallic sheaths, armors and conduits, enclosing power conductors and frames, casings and metal enclosures of electric equipment, and the earth, unless approved by an authorized representative of the Secretary.

§ 75.703 Grounding offtrack direct-current machines and the enclosures of related detached components.

[STATUTORY PROVISIONS]

The frames of all offtrack direct-current machines and the enclosures of related detached components shall be effectively grounded, or otherwise maintained at no less safe voltages, by methods approved by an authorized representative of the Secretary.

§ 75.703-1 Approved method of grounding.

In instances where the metal frames both of an offtrack direct-current machine and of the metal frames of its component parts are grounded to the same grounding medium the requirements of § 75.703 will be met.

§ 75.703-2 Approved grounding mediums.

For purposes of grounding offtrack direct-current machines, the following grounding mediums are approved:

(a) The grounded polarity of the direct-current power system feeding such machines; or,

(b) The alternating current grounding medium where such machines are fed by an ungrounded direct-current power system originating in a portable rectifier receiving its power from a section power center. However, when such a medium is used, a separate grounding conductor must be employed.

§ 75.703-3 Approved methods of grounding offtrack mobile, portable and stationary direct-current machines.

In grounding offtrack direct-current machines and the enclosures of their component parts, the following methods of grounding will meet the requirements of § 75.703:

(a) The use of a separate grounding conductor located within the trailing cable of mobile and portable equipment and connected between such equipment and the direct-current grounding medium;

(b) The use of a separate ground conductor located within the direct-current power cable feeding stationary equipment and connected between such stationary equipment and the direct-current grounding medium;

(c) The use of a separate external ground conductor connected between stationary equipment and the direct-current grounding medium; or,

(d) The use of silicon diodes; however, the installation of such devices shall meet the following minimum requirements:

(1) Installation of silicon diodes shall be restricted to electric equipment receiving power from a direct-current system with one polarity grounded;

(2) Where such diodes are used on circuits having a nominal voltage rating of 250, they must have a forward current rating of 400 amperes or more, and have a peak inverse voltage rating of 400 or more;

(3) Where such diodes are used on circuits having a nominal voltage rating of 550, they must have a forward current rating of 250 amperes or more, and have a peak inverse voltage rating of 800 or more;

(4) Where fuses approved by the Secretary are used at the outby end of a trailing cable connected to electrical equipment employing silicon diodes, the rating of such fuses must not exceed 150 percent of the nominal current rating of the grounding diodes;

(5) Where circuit breakers are used at the outby end of a trailing cable connected to electrical equipment employing silicon diodes, the instantaneous trip setting shall not exceed 300 percent of the nominal current rating of the grounding diode;

(6) Overcurrent devices must be used and installed in such a manner that the operating coil circuit of the main contactor will open when a fault current with a value of 25 percent or less of the diode rating flows through the diode;

(7) The silicon diode installed must be suitable to the grounded polarity of the power system in which it is used and its threaded base must be solidly connected to the machine frame on which it is installed;

(8) In addition to the grounding diode, a polarizing diode must be installed in the machine control circuit to prevent operation of the machine

when the polarity of a trailing cable is reversed;

(9) When installed on permissible equipment, all grounding diodes, overcurrent devices, and polarizing diodes must be placed in explosion proof compartments;

(10) When grounding diodes are installed on a continuous miner, their nominal diode current rating must be at least 750 amperes or more; and,

(11) All grounding diodes shall be tested, examined and maintained as electrical equipment in accordance with the provisions of § 75.512.

§ 75.703-4 Other methods of protecting offtrack direct-current equipment; approved by an authorized representative of the Secretary.

Other methods of maintaining safe voltage by preventing a difference between the frames of offtract direct-current machines and the earth must be approved by an authorized representative of the Secretary.

§ 75.704 Grounding frames of stationary high voltage equipment receiving power from ungrounded delta systems.

[STATUTORY PROVISIONS]

The frames of all stationary high-voltage equipment receiving power from ungrounded delta systems shall be grounded by methods approved by an authorized representative of the Secretary.

§ 75.704-1 Approved methods of grounding.

The methods of grounding stated in § 75.701-1 will also be approved with respect to the grounding of frames of high-voltage equipment referred to in § 75.704.

§ 75.705 Work on high-voltage lines; deenergizing and grounding.

[STATUTORY PROVISIONS]

High-voltage lines, both on the surface and underground, shall be deenergized and grounded before work is performed on them, except that repairs may be permitted, in the case of energized surface high-voltage lines, if such repairs are made by a qualified person in accordance with procedures and safeguards, including, but not limited to, a requirement that the operator of such mine provide, test, and maintain protective devices in making such repairs, to be prescribed by the Secretary prior to March 30, 1970.

§ 75.705-1 Work on high-voltage lines.

(a) Section 75.705 specifically prohibits work on energized high-voltage lines underground;

(b) No high-voltage line, either on the surface or underground, shall be regarded as deenergized for the purpose of performing work on it, until it has been determined by a qualified person (as provided in § 75.153) that such high-voltage line has been deenergized and grounded. Such qualified person shall by visual observation (1) determine that the disconnecting devices on the high-voltage circuit are in open position and (2) ensure that each ungrounded conductor of the high-voltage circuit upon which work is to be done is properly connected to the system-grounding medium. In the case of resistance grounded or solid wye-connected systems, the neutral wire is the system-grounding medium. In the case of an ungrounded power system, either the steel armor or conduit enclosing the system or a surface grounding field is a system grounding medium;

(c) No work shall be performed on any high-voltage line on the surface which is supported by any pole or structure which also supports other high-voltage lines until: (1) All lines supported on the pole or structure are deenergized and grounded in accordance with all of the provisions of this section which apply to the repair of energized surface high-voltage lines; or (2) the provisions of §§ 75.705-2 through 75.705-10 have been complied with, with respect to all lines, which are supported on the pole or structure.

(d) Work may be performed on energized surface high-voltage lines only in accordance with the provisions of §§ 75.705-2 through 75.705-10, inclusive.

§ 75.705-2 Repairs to energized surface high-voltage lines.

An energized high-voltage surface line may be repaired only when

(a) The operator has determined that:

(1) Such repairs cannot be scheduled during a period when the power circuit could be properly deenergized and grounded;

(2) Such repairs will be performed on power circuits with a phase-to-phase nominal voltage no greater than 15,000 volts;

(3) Such repairs on circuits with a phase-to-phase nominal voltage of 5,000 volts or more will be performed only with the use of live line tools;

(4) Weather conditions will not interfere with such repairs or expose those persons assigned to such work to an imminent danger; and

(b) The operator has designated a person qualified under the provisions of § 75.154 as the person responsible for carrying out such repairs and such person, in order to ensure protection for himself and other qualified persons assigned to perform such repairs from the hazards of such repair, has prepared and filed with the operator:

(1) A general description of the nature and location of the damage or defect to be repaired;

(2) The general plan to be followed in making such repairs;

(3) A statement that a briefing of all qualified persons assigned to make such repairs was conducted informing them of the general plan, their individual assignments, and the dangers inherent in such assignments;

(4) A list of the proper protective equipment and clothing that will be provided; and

(5) Such other information as the person designated by the operator feels necessary to describe properly the means or methods to be employed in such repairs.

§ 75.705-3 Work on energized high-voltage surface lines; reporting.

Any operator designating and assigning qualified persons to perform repairs on energized high-voltage surface lines under the provisions of § 75.705-2 shall maintain a record of such repairs. Such record shall contain a notation of the time, date, location, and general nature of the repairs made, together with a copy of the information filed with the operator by the qualified person designated as responsible for performing such repairs.

§ 75.705-4 Simultaneous repairs.

When two or more persons are working on an energized high-voltage surface line simultaneously, and any one of them is within reach of another, such persons shall not be allowed to work on different phases or on equipment with different potentials.

§ 75.705-5 Installation of protective equipment.

Before repair work on energized high-voltage surface lines is begun, protective equipment shall be used to cover all bare conductors, ground wires, guys, telephone lines, and other attachments in proximity to the area of planned repairs. Such protective equipment shall be installed from a safe position below the conductors or other apparatus being covered. Each rubber protective device employed in the making of repairs shall have a dielectric strength of 20,000 volts, or more.

§ 75.705-6 Protective clothing; use and inspection.

All persons performing work on energized high-voltage surface lines shall wear protective rubber gloves, sleeves, and climber guards if climbers are worn. Protective rubber gloves shall not be worn wrong side out or without protective leather gloves. Protective devices worn by a person assigned to perform repairs on high-voltage surface lines shall be worn continuously from the time he leaves the ground until he returns to the ground, and, if such devices are employed for extended periods, such person shall visually inspect the equipment assigned him for defects before each use and, in no case, less than twice each day.

§ 75.705-7 Protective equipment; inspection.

Each person shall visually inspect protective equipment and clothing provided him in connection with work on high-voltage surface lines before using such equipment and clothing, and any equipment or clothing containing any defect or damage shall be discarded and replaced with proper protective equipment or clothing prior to the performance of any electrical work on such lines.

§ 75.705-8 Protective equipment; testing and storage.

(a) All rubber protective equipment used on work on energized high-voltage surface lines shall be electrically tested by the operator in accordance with ASTM standards, Part 28, published February 1968, and such testing shall be conducted in accordance with the following schedule:

(1) Rubber gloves, once each month;

(2) Rubber sleeves, once every 3 months;

(3) Rubber blankets, once every 6 months;

(4) Insulator hoods and line hose, once a year; and

(5) Other electric protective equipment, once a year.

(b) Rubber gloves shall not be stored wrong side out. Blankets shall be rolled when not in use, and line hose and insulator hoods shall be stored in their natural position and shape.

§ 75.705-9 Operating disconnecting or cutout switches.

Disconnecting or cutout switches on energized high-voltage surface lines shall be operated only with insulated sticks, fuse tongs, or pullers which are adequately insulated and maintained to protect the operator from the voltage to which he is exposed. When such switches are operated from the ground, the person operating such devices shall wear protective rubber gloves.

§ 75.705-10 Tying into energized high-voltage surface circuits.

If the work of forming an additional circuit by tying into an energized high-voltage surface line is performed from the ground, any person performing such work must wear and employ all of the protective equipment and clothing required under the provisions of §§ 75.705-5 and 75.705-6. In addition, the insulated stick used by such person must have been designed for such purpose and must be adequately insulated and be maintained to protect such person from the voltage to which he is exposed.

§ 75.705-11 Use of grounded messenger wires; ungrounded systems.

Solely for purposes of grounding ungrounded high-voltage power systems, grounded messenger wires used to suspend the cables of such systems may be used as a grounding medium.

§ 75.706 Deenergized underground power circuits; idle days—idle shifts.

[STATUTORY PROVISIONS]

When not in use, power circuits underground shall be deenergized on idle days and idle shifts, except that rectifiers and transformers may remain energized.

Subpart I—Underground High-Voltage Distribution

§ 75.800 High-voltage circuits; circuit breakers.

[STATUTORY PROVISIONS]

High-voltage circuits entering the underground area of any coal mine shall be protected by suitable circuit breakers of adequate interrupting capacity which are properly tested and maintained as prescribed by the Secretary. Such breakers shall be equipped with devices to provide protection against under-voltage grounded phase, short circuit, and overcurrent.

§ 75.800-1 Circuit breakers; location.

Circuit breakers protecting high-voltage circuits entering an underground area of any coal mine shall be located on the surface and in no case installed either underground or within a drift.

§ 75.800-2 Approved circuit schemes.

The following circuit schemes will be regarded as providing the necessary protection to the circuits required by § 75.800:

(a) Ground check relays may be used for undervoltage protection if the relay coils are designed to trip the circuit breaker when line voltage decreases to 40 percent to 60 percent of the nominal line voltage;

(b) Ground trip relays on resistance grounded systems will be acceptable as grounded phase protection;

(c) One circuit breaker may be used to protect two or more branch circuits, if the circuit breaker is adjusted to afford overcurrent protection for the smallest conductor.

§ 75.800-3 Testing, examination and maintenance of circuit breakers; procedures.

(a) Circuit breakers and their auxiliary devices protecting underground high-voltage circuits shall be tested and examined at least once each month by a person qualified as provided in § 75.153;

(b) Tests shall include: (1) Breaking continuity of the ground check conductor, where ground check monitoring is used; and

(2) Actuating at least two (2) of the auxiliary protective relays.

(c) Examination shall include visual observation of all components of the circuit breaker and its auxiliary devices, and such repairs or adjustments as are indicated by such tests and examinations shall be carried out immediately.

§ 75.800-4 Testing, examination and maintenance of circuit breakers; record.

The operator of any coal mine shall maintain a written record of each test, examination, repair, or adjustment of all circuit breakers protecting high voltage circuits which enter any underground area of the coal mine. Such record shall be kept in a book approved by the Secretary.

OMB CONTROL No. 1219-0067. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.801 Grounding resistors.

[STATUTORY PROVISIONS]

The grounding resistor, where required, shall be of the proper ohmic value to limit the voltage drop in the grounding circuit external to the resistor to not more than 100 volts under fault conditions. The grounding resistor shall be rated for maximum fault current continuously and insulated from ground for a voltage equal to the phase-to-phase voltage of the system.

§ 75.802 Protection of high-voltage circuits extending underground.

(a) Except as provided in paragraph (b) of this section, high-voltage circuits extending underground and supplying portable, mobile, or, stationary high-voltage equipment shall contain either a direct or derived neutral which shall be grounded through a suitable resistor at the source transformers, and a grounding circuit, originating at the grounded side of the grounding resistor, shall extend along with the power conductors and serve as a grounding conductor for the frames of all high-voltage equipment supplied power from that circuit.

(b) Notwithstanding the requirements of paragraph (a) of this section, the Secretary or his authorized representative may permit ungrounded high-voltage circuits to be extended underground to feed stationary electric equipment if:

(1) Such circuits are either steel armored or installed in grounded, rigid steel conduit throughout their entire length; or,

(2) The voltage of such circuits is nominally 2,400 volts or less phase-to-phase and the cables used in such circuits are equipped with metallic shields around each power conductor, and contain one or more ground conductors having a total cross sectional area of not less than one-half the power conductor; and,

(3) Upon a finding by the Secretary or his authorized representative that the use of the circuits described in paragraphs (b) (1) and (2) of this section does not pose a hazard to the miners.

(c) Within 100 feet of the point on the surface where high-voltage circuits enter the underground portion of the mine, disconnecting devices shall be installed and so equipped or designed in such a manner that it can be determined by visual observation that the power is disconnected, except that the

Secretary or his authorized representative may permit such devices to be installed at a greater distance from such area of the mine if he determines, based on existing physical conditions, that such installation will be more accessible at a greater distance and will not pose any hazard to the miners.

[38 FR 4975, Feb. 23, 1973]

§ 75.803 Fail safe ground check circuits on high-voltage resistance grounded systems.

[STATUTORY PROVISIONS]

On and after September 30, 1970, high-voltage, resistance grounded systems shall include a fail safe ground check circuit to monitor continuously the grounding circuit to assure continuity and the fail safe ground check circuit shall cause the circuit breaker to open when either the ground or pilot check wire is broken, or other no less effective device approved by the Secretary or his authorized representative to assure such continuity, except that an extension of time, not in excess of 12 months, may be permitted by the Secretary on a mine-by-mine basis if he determines that such equipment is not available.

§ 75.803-1 Maximum voltage ground check circuits.

The maximum voltage used for ground check circuits under § 75.803 shall not exceed 96 volts.

§ 75.803-2 Ground check systems not employing pilot check wires; approval by the Secretary.

Ground check systems not employing pilot check wires will be approved only if it is determined that the system includes a fail safe design causing the circuit breaker to open when ground continuity is broken.

§ 75.804 Underground high-voltage cables.

(a) Underground high-voltage cables used in resistance grounded systems shall be equipped with metallic shields around each power conductor with one or more ground conductors having a total cross sectional area of not less than one-half the power conductor, and with an insulated external conductor not smaller than No. 8 (A.W.G.) or an insulated internal ground check conductor not smaller than No. 10 (A.W.G.) for the ground continuity check circuit.

(b) All such cables shall be adequate for the intended current and voltage. Splices made in such cables shall provide continuity of all components.

[38 FR 4976, Feb. 23, 1973]

§ 75.805 Couplers.

[STATUTORY PROVISIONS]

Couplers that are used with medium-voltage or high-voltage power circuits shall be of the three-phase type with a full metallic shell, except that the Secretary may permit, under such guidelines as he may prescribe, no less effective couplers constructed of materials other than metal. Couplers shall be adequate for the voltage and current expected. All exposed metal on the metallic couplers shall be grounded to the ground conductor in the cable. The coupler shall be constructed so that the ground check continuity conductor shall be broken first and the ground conductors shall be broken last when the coupler is being uncoupled.

§ 75.806 Connection of single-phase loads.

[STATUTORY PROVISIONS]

Single-phase loads, such as transformer primaries, shall be connected phase-to-phase.

§ 75.807 Installation of high-voltage transmission cables.

[STATUTORY PROVISIONS]

All underground high-voltage transmission cables shall be installed only in regularly inspected air courses and haulageways, and shall be covered, buried, or placed so as to afford protection against damage, guarded where men regularly work or pass under them unless they are 6½ feet or more above the floor or rail, securely anchored, properly insulated, and guarded at ends, and covered, insulated, or placed to prevent contact with trolley wires and other low-voltage circuits.

§ 75.808 Disconnecting devices.

[STATUTORY PROVISIONS]

Disconnecting devices shall be installed at the beginning of branch lines in high-voltage circuits and equipped or designed in such a manner that it can be determined by visual observation that the circuit is deenergized when the switches are open.

§ 75.809 Identification of circuit breakers and disconnecting switches.

[STATUTORY PROVISIONS]

Circuit breakers and disconnecting switches underground shall be marked for identification.

§ 75.810 High-voltage trailing cables; splices.

[STATUTORY PROVISIONS]

In the case of high-voltage cables used as trailing cables, temporary splices shall not be used and all permanent splices shall be made in accordance with § 75.604. Terminations and splices in all other high-voltage cables shall be made in accordance with the manufacturer's specifications.

§ 75.811 High-voltage underground equipment; grounding.

[STATUTORY PROVISIONS]

Frames, supporting structures and enclosures of stationary, portable, or mobile underground high-voltage equipment and all high-voltage equipment supplying power to such equipment receiving power from resistance grounded systems shall be effectively grounded to the high-voltage ground.

§ 75.812 Movement of high-voltage power centers and portable transformers; permit.

[STATUTORY PROVISIONS]

Power centers and portable transformers shall be deenergized before they are moved from one location to another, except that, when equipment powered by sources other than such centers or transformers is not available, the Secretary may permit such centers and transformers to be moved while energized, if he determines that another equivalent or greater hazard may otherwise be created, and if they are moved under the supervision of a qualified person, and if such centers and transformers are examined prior to such movement by such person and found to be grounded by methods approved by an authorized representative of the Secretary and otherwise protected from hazards to the miner. A record shall be kept of such examinations. High-voltage cables, other than trailing cables, shall not be moved or handled at any time while energized, except that, when such centers and transformers are moved while energized as permitted under this section, energized high-voltage cables attached to such centers and transformers may be moved only by a qualified person and the operator of such mine shall require that such person wear approved and tested insulated wireman's gloves.

OMB CONTROL No. 1219-0067. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.812-1 Qualified person.

A person who meets the requirements of § 75.153 is a qualified person within the meaning of § 75.812.

§ 75.812-2 High-voltage power centers and transformers; record of examination.

The operator shall maintain a record of all examinations conducted in accordance with § 75.812. Such record shall be kept in a book approved by the Secretary.

Subpart J—Underground Low- and Medium-Voltage Alternating Current Circuits

§ 75.900 Low- and medium-voltage circuits serving three-phase alternating current equipment; circuit breakers.

[STATUTORY PROVISIONS]

Low- and medium-voltage power circuits serving three-phase alternating current equipment shall be protected by suitable circuit breakers of adequate interrupting capacity which are properly tested and maintained as prescribed by the Secretary. Such breakers shall be equipped with devices to provide protection against undervoltage, grounded phase, short circuit, and overcurrent.

§ 75.900-1 Circuit breakers; location.

Circuit breakers used to protect low- and medium-voltage circuits underground shall be located in areas which are accessible for inspection, examination, and testing, have safe roofs, and are clear of any moving equipment used in haulageways.

§ 75.900-2 Approved circuit schemes.

The following circuit schemes will be regarded as providing the necessary protection to the circuit required by § 75.900:

(a) Ground check relays may be used for undervoltage protection if the relay coils are designed to trip the circuit breaker when line voltage decreases to 40 to 60 percent of the nominal line voltage.

(b) One undervoltage device installed in the main secondary circuit at the source transformer may be used to provide undervoltage protection for each circuit that receives power from that transformer.

(c) One circuit breaker may be used to protect two or more branch circuits if the circuit breaker is adjusted to afford overcurrent protection for the smallest conductor.

(d) Circuit breakers with shunt trip, series trip or undervoltage release devices may be used if the tripping elements of such devices are selected or adjusted in accordance with the settings listed in the tables of the National Electric Code, 1968.

§ 75.900-3 Testing, examination, and maintenance of circuit breakers; procedures.

Circuit breakers protecting low- and medium-voltage alternating current circuits serving three-phase alternating current equipment and their auxiliary devices shall be tested and examined at least once each month by a person qualified as provided in § 75.153. In performing such tests, actuating any of the circuit breaker auxiliaries or control circuits in any manner which causes the circuit breaker to open, shall be considered a proper test. All components of the circuit breaker and its auxiliary devices shall be visually examined and such repairs or adjustments as are indicated by such tests and examinations shall be carried out immediately.

§ 75.900-4 Testing, examination, and maintenance of circuit breakers; record.

The operator of any coal mine shall maintain a written record of each test, examination, repair, or adjustment of all circuit breakers protecting low- and medium-voltage circuits serving three-phase alternating current equipment used in the mine. Such record shall be kept in a book approved by the Secretary.

OMB CONTROL NO 1219-0067. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.901 Protection of low- and medium-voltage three-phase circuits used underground.

[STATUTORY PROVISIONS]

(a) Low- and medium-voltage three-phase alternating-current circuits used underground shall contain either a direct or derived neutral which shall be grounded through a suitable resistor at the power center, and a grounding circuit, originating at the grounded side of the grounding resistor, shall extend along with the power conductors and serve as a grounding conductor for the frames of all the electrical equipment supplied power from that circuit, except that the Secretary or his authorized representative may permit ungrounded low- and medium-voltage circuits to be used underground to feed such stationary electrical equipment if such circuits are either steel armored or installed in grounded rigid steel conduit throughout their entire length. The grounding resistor, where required, shall be of the proper ohmic value to limit the ground fault current to 25 amperes. The grounding resistor shall be rated for maximum fault current continuously and insulated from ground for a voltage equal to the phase-to-phase voltage of the system.

§ 75.902 Low- and medium-voltage ground check monitor circuits.

[STATUTORY PROVISIONS]

On or before September 30, 1970, low- and medium-voltage resistance grounded systems shall include a fail-safe ground check circuit to monitor continuously the grounding circuit to assure continuity which ground check circuit shall cause the circuit breaker to open when either the ground or pilot check wire is broken, or other no less effective device approved by the Secretary or his authorized representative to assure such continuity, except that an extention of time, not in excess of 12 months, may be permitted by the Secretary on a mine-by-mine basis if he determines that such equipment is not available. Cable couplers shall be constructed so that the ground check continuity conductor shall be broken first and the ground conductors shall be broken last when the coupler is being uncoupled.

§ 75.902-1 Maximum voltage ground check circuits.

The maximum voltage used for such ground check circuits shall not exceed 40 volts.

§ 75.902-2 Approved ground check systems not employing pilot check wires.

Ground check systems not employing pilot check wires will be approved only if it is determined that the system includes a fail safe design causing the circuit breaker to open when ground continuity is broken.

§ 75.902-4 Attachment of ground conductors and ground check wires to equipment frames; use of separate connections.

In grounding equipment frames of all stationary, portable or mobile equipment receiving power from resistance grounded systems separate connections shall be used when practicable.

§ 75.903 Disconnecting devices.

[STATUTORY PROVISIONS]

Disconnecting devices shall be installed in conjunction with the circuit breaker to provide visual evidence that the power is disconnected.

§ 75.904 Identification of circuit breakers.

[STATUTORY PROVISIONS]

Circuit breakers shall be marked for identification.

§ 75.905 Connection of single-phase loads.

[STATUTORY PROVISIONS]

Single-phase loads shall be connected phase-to-phase.

§ 75.906 Trailing cables for mobile equipment, ground wires, and ground check wires.

[STATUTORY PROVISIONS]

Trailing cables for mobile equipment shall contain one or more ground conductors having a cross-sectional area of not less than one-half the power conductor, and, on September 30, 1970, an insulated conductor for the ground continuity check circuit or other no less effective device approved by the Secretary or his authorized representative to assure such continuity, except that an extension of time, not in excess of 12 months may be permitted by the Secretary on a mine-by-mine basis if he determines that such equipment is not available. Splices made in the cables shall provide continuity of all components.

§ 75.907 Design of trailing cables for medium-voltage circuits.

[Statutory Provisions]

Trailing cables for medium-voltage circuits shall include grounding conductors, a ground check conductor, and grounded metallic shields around each power conductor or a ground metallic shield over the assembly, except that on equipment employing cable reels, cables without shields may be used if the insulation is rated 2,000 volts or more.

Subpart K—Trolley Wires and Trolley Feeder Wires

§ 75.1000 Cutout switches.

[Statutory Provisions]

Trolley wires and trolley feeder wires, shall be provided with cutout switches at intervals of not more than 2,000 feet and near the beginning of all branch lines.

§ 75.1001 Overcurrent protection.

[Statutory Provisions]

Trolley wires and trolley feeder wires shall be provided with overcurrent protection.

§ 75.1001-1 Devices for overcurrent protection; testing and calibration requirements; records.

(a) Automatic circuit interrupting devices that will deenergize the affected circuit upon occurrence of a short circuit at any point in the system will meet the requirements of § 75.1001.

(b) Automatic circuit interrupting devices described in paragraph (a) of this section shall be tested and calibrated at intervals not to exceed six months. Testing of such devices shall include passing the necessary amount of electric current through the device to cause activation. Calibration of such devices shall include adjustment of all associated relays to ±15 percent of the indicated value. An authorized representative of the Secretary may require additional testing or calibration of these devices.

(c) A record of the tests and calibrations required by paragraph (b) of this section shall be kept, and shall be made available, upon request, to an authorized representative of the Secretary.

OMB Control No. 1219-0067. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[38 FR 29998, Oct. 31, 1973, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.1002 Location of trolley wires, trolley feeder wires, high-voltage cables and transformers.

[Statutory Provisions]

Trolley wires and trolley feeder wires, high-voltage cables and transformers shall not be located inby the last open crosscut and shall be kept at least 150 feet from pillar workings.

§ 75.1002-1 Location of other electric equipment; requirements for permissibility.

(a) Electric equipment other than trolley wires, trolley feeder wires, high-voltage cables, and transformers shall be permissible, and maintained in a permissible condition when such electric equipment is located within 150 feet from pillar workings, except as provided in paragraphs (b) and (c) of this section.

(b) Notwithstanding the provisions of paragraph (a) of this section, in any coal mine where nonpermissible electric face equipment may be taken into or used inby the last open crosscut until March 30, 1974, such nonpermissible electric face equipment may be located within 150 feet from pillar workings.

(c) Notwithstanding the provisions of paragraph (a) of this section, in any coal mine where a permit for noncompliance is in effect, nonpermissible electric face equipment specified in such permit for noncompliance may be located within 150 feet from pillar workings for the duration of such permit.

[38 FR 4976, Feb. 23, 1973]

§ 75.1003 Insulation of trolley wires, trolley feeder wires and bare signal wires; guarding of trolley wires and trolley feeder wires.

[STATUTORY PROVISIONS]

Trolley wires, trolley feeder wires, and bare signal wires shall be insulated adequately where they pass through doors and stoppings, and where they cross other power wires and cables. Trolley wires and trolley feeder wires shall be guarded adequately:

(a) At all points where men are required to work or pass regularly under the wires;

(b) On both sides of all doors and stoppings; and

(c) At man-trip stations.

The Secretary or his authorized representatives shall specify other conditions where trolley wires and trolley feeder wires shall be adequately protected to prevent contact by any person, or shall require the use of improved methods to prevent such contact. Temporary guards shall be provided where trackmen and other persons work in proximity to trolley wires and trolley feeder wires.

§ 75.1003-1 Other requirements for guarding of trolley wires and trolley feeder wires.

Adequate precaution shall be taken to insure that equipment being moved along haulageways will not come in contact with trolley wires or trolley feeder wires.

§ 75.1003-2 Requirements for movement of off-track mining equipment in areas of active workings where energized trolley wires or trolley feeder wires are present; pre-movement requirements; certified and qualified persons.

(a) Prior to moving or transporting any unit of off-track mining equipment in areas of the active workings where energized trolley wires or trolley feeder wires are present:

(1) The unit of equipment shall be examined by a certified person to ensure that coal dust, float coal dust, loose coal oil, grease, and other combustible materials have been cleaned up and have not been permitted to accumulate on such unit of equipment; and,

(2) A qualified person, as specified in § 75.153 of this part, shall examine the trolley wires, trolley feeder wires, and the associated automatic circuit interrupting devices provided for short circuit protection to ensure that proper short circuit protection exists.

(b) A record shall be kept of the examinations required by paragraph (a) of this section, and shall be made available, upon request, to an authorized representative of the Secretary.

(c) Off-track mining equipment shall be moved or transported in areas of the active workings where energized trolley wires or trolley feeder wires are present only under the direct supervision of a certified person who shall be physically present at all times during moving or transporting operations.

(d) The frames of off-track mining equipment being moved or transported, in accordance with this section, shall be covered on the top and on the trolley wire side with fire-resistant material which has met the applicable requirements of Part 18 of Subchapter D of this chapter (Bureau of Mines Schedule 2G).

(e) Electrical contact shall be maintained between the mine track and the frames of off-track mining equipment being moved in-track and trolley entries, except that rubber-tired equipment need not be grounded to a transporting vehicle if no metal part of such rubber-tired equipment can come into contact with the transporting vehicle.

(f) A minimum vertical clearance of 12 inches shall be maintained between the farthest projection of the unit of equipment which is being moved and the energized trolley wires or trolley feeder wires at all times during the movement or transportation of such equipment; provided, however, that if the height of the coal seam does not permit 12 inches of vertical clearance to be so maintained, the following additional precautions shall be taken:

(1)(i) Except as provided in paragraph (f)(1)(ii) of this section electric power shall be supplied to the trolley wires or trolley feeder wires only from outby the unit of equipment being moved or transported. (ii) Where direct current electric power is used and such electric power can be supplied only from inby the equipment being moved or transported, power may be supplied from inby such equipment provided a miner with the means to cut off the power, and in direct communication with persons actually engaged in the moving or transporting operation, is stationed outby the equipment being moved.

(2) The settings of automatic circuit interrupting devices used to provide short circuit protection for the trolley circuit shall be reduced to not more than one-half of the maximum current that could flow if the equipment being moved or transported were to come into contact with the trolley wire or trolley feeder wire;

(3) At all times the unit of equipment is being moved or transported, a miner shall be stationed at the first automatic circuit breaker outby the equipment being moved and such miner shall be: (i) In direct communication with persons actually engaged in the moving or transporting operation, and (ii) capable of communicating with the responsible person on the surface required to be on duty in accordance with § 75.1600-1 of this part;

(4) Where trolley phones are utilized to satisfy the requirements of paragraph (f)(3) of this section, telephones or other equivalent two-way communication devices that can readily be connected with the mine communication system shall be carried by the miner stationed at the first automatic circuit breaker outby the equipment being moved and by a miner actually engaged in the moving or transporting operation; and,

(5) No person shall be permitted to be inby the unit of equipment being moved or transported, in the ventilating current of air that is passing over such equipment, except those persons directly engaged in moving such equipment.

(g) The provisions of paragraphs (a) through (f) of this section shall not apply to units of mining equipment that are transported in mine cars, provided that no part of the equipment extends above or over the sides of the mine car.

OMB CONTROL NO. 1219-0067. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[38 FR 29998, Oct. 31, 1973, as amended at 47 FR 14706, Apr. 6, 1982]

Subpart L—Fire Protection

§ 75.1100 Requirements.

[STATUTORY PROVISION]

Each coal mine shall be provided with suitable firefighting equipment adapted for the size and conditions of the mine. The Secretary shall establish minimum requirements of the type, quality, and quantity of such equipment.

§ 75.1100-1 Type and quality of firefighting equipment.

Firefighting equipment required under this subpart shall meet the following minimum requirements:

(a) Waterlines: Waterlines shall be capable of delivering 50 gallons of water a minute at a nozzle pressure of 50 pounds per square inch.

(b) Portable water cars: A portable water car shall be of at least 1,000 gallons capacity (500 gallons capacity for anthracite mines) and shall have at least 300 feet of fire hose with nozzles. A portable water car shall be capable of providing a flow through the hose of 50 gallons of water per minute at a nozzle pressure of 50 pounds per square inch.

(c) A portable chemical car shall carry enough chemicals to provide a fire extinguishing capacity equivalent to that of a portable water car.

(d) Portable foam-generating machines or devices: A portable foam-generating machine or device shall have facilities and equipment for supplying the machine with 30 gallons of water per minute at 30 pounds per square inch for a period of 35 minutes.

(e) Portable fire extinguisher: A portable fire extinguisher shall be either (1) a multipurpose dry chemical type containing a nominal weight of 5 pounds of dry powder and enough expellant to apply the powder or (2) a foam-producing type containing at least 2½ gallons of foam-producing liquids and enough expellant to supply the foam. Only fire extinguishers approved by the Underwriters Laboratories, Inc., or Factory Mutual Research Corp., carrying appropriate labels as to type and purpose, shall be used. After March 30, 1971, all new portable fire extinguishers acquired for use in a coal mine shall have a 2A 10 BC or higher rating.

(f)(1) Except as provided in paragraph (f)(2) of this section, the fire hose shall be lined with a material having flame resistant qualities meeting requirements for hose in Bureau of Mines' Schedule 2G. The cover shall be polyester, or other material with flame-spread qualities and mildew resistance equal or superior to polyester. The bursting pressure shall be at least 4 times the water pressure at the valve to the hose inlet with the valve closed; the maximum water pressure in the hose nozzle shall not exceed 100 p.s.i.g.

(2) Fire hose installed for use in underground coal mines prior to December 30, 1970, shall be mildew-proof and have a bursting pressure at least 4 times the water pressure at the valve to the hose inlet with the valve closed, and the maximum water pressure in the hose nozzle with water flowing shall not exceed 100 p.s.i.g.

§ 75.1100-2 Quantity and location of firefighting equipment.

(a) *Working sections.* (1) Each working section of coal mines producing 300 tons or more per shift shall be provided with two portable fire extinguishers and 240 pounds of rock dust in bags or other suitable containers; waterlines shall extend to each section loading point and be equipped with enough fire hose to reach each working face unless the section loading point is provided with one of the following:

(i) Two portable water cars; or

(ii) Two portable chemical cars; or

(iii) One portable water car or one portable chemical car, and either (*a*) a portable foam-generating machine or (*b*) a portable high-pressure rock-dusting machine fitted with at least 250 feet of hose and supplied with at least 60 sacks of rock dust.

(2) Each working section of coal mines producing less than 300 tons of coal per shift shall be provided with two portable fire extinguishers, 240 pounds of rock dust in bags or other suitable containers, and at least 500 gallons of water and at least 3 pails of 10 quart capacity. In lieu of the 500 gallon water supply a waterline with sufficient hose to reach the working places, a portable water car (500 gallons capacity) or a portable all-purpose dry powder chemical car of at least 125-pounds capacity may be provided.

(b) *Belt conveyors.* In all coal mines, waterlines shall be installed parallel to the entire length of belt conveyors and shall be equipped with firehose outlets with valves at 300-foot intervals along each belt conveyor and at tailpieces. At least 500 feet of firehose with fittings suitable for connection with each belt conveyor waterline system shall be stored at strategic locations along the belt conveyor. Waterlines may be installed in entries adjacent to the conveyor entry belt as long as the outlets project into the belt conveyor entry.

(c) *Haulage tracks.* (1) In mines producing 300 tons of coal or more per shift waterlines shall be installed parallel to all haulage tracks using mechanized equipment in the track or adjacent entry and shall extend to the loading point of each working section. Waterlines shall be equipped with outlet valves at intervals of not more than 500 feet, and 500 feet of firehose with fittings suitable for connection with such waterlines shall be provided at strategic locations. Two portable water cars, readily available, may be used in lieu of waterlines prescribed under this paragraph.

(2) In mines producing less than 300 tons of coal per shift, there shall be provided at 500-foot intervals in all main and secondary haulage roads:

(i) A tank of water of at least 55-gallon capacity with at least 3 pails of not less than 10-quart capacity; or

(ii) Not less than 240 pounds of bagged rock dust.

(d) *Transportation.* Each track or off-track locomotive, self-propelled man-trip car, or personnel carrier shall be equipped with one portable fire extinguisher.

(e) *Electrical installations.* (1) Two portable fire extinguishers or one extinguisher having at least twice the minimum capacity specified for a portable fire extinguisher in § 75.1100-1(e) shall be provided at each permanent electrical installation.

(2) One portable fire extinguisher and 240 pounds of rock dust shall be provided at each temporary electrical installation.

(f) *Oil storage stations.* Two portable fire extinguishers and 240 pounds of rock dust, shall be provided at each permanent underground oil storage station. One portable fire extinguisher shall be provided at each working section where 25 gallons or more of oil are stored in addition to extinguishers required under paragraph (a) of this section.

(g) *Welding, cutting, soldering.* One portable fire extinguisher or 240 pounds of rock dust shall be provided at locations where welding, cutting, or soldering with arc or flame is being done.

(h) *Powerlines.* At each wooden door through which powerlines pass there shall be one portable fire extinguisher or 240 pounds of rock dust within 25 feet of the door on the intake air side.

(i) *Emergency materials.* (1) At each mine producing 300 tons of coal or more per shift there shall be readily available the following materials at locations not exceeding 2 miles from each working section:

1,000 board feet of brattice boards
2 rolls of brattice cloth
2 hand saws
25 pounds of 8^d nails
25 pounds of 10^d nails
25 pounds of 16^d nails
3 claw hammers
25 bags of wood fiber plaster or 10 bags of cement (or equivalent material for stoppings)
5 tons of rock dust

(2) At each mine producing less than 300 tons of coal per shift the above materials shall be available at the mine, provided, however, that the emergency materials for one or more mines may be stored at a central warehouse or building supply company and such supply must be the equivalent of that required for all mines involved and within 1-hour's delivery time from each mine. This exception shall not apply where the active working sections are more than 2 miles from the surface.

§ 75.1100-3 Condition and examination of firefighting equipment.

All firefighting equipment shall be maintained in a usable and operative condition. Chemical extinguishers shall be examined every 6 months and the date of the examination shall be written on a permanent tag attached to the extinguisher.

OMB CONTROL No. 1219-0053. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.1101 Deluge-type water sprays, foam generators; main and secondary belt-conveyor drives.

[STATUTORY PROVISIONS]

Deluge-type water sprays or foam generators automatically actuated by rise in temperature, or other no less effective means approved by the Secretary of controlling fire, shall be installed at main and secondary belt-conveyor drives.

§ 75.1101-1 Deluge-type water spray systems.

(a) Deluge-type spray systems shall consist of open nozzles attached to branch lines. The branch lines shall be connected to a waterline through a control valve operated by a fire sensor. Actuation of the control valve shall cause water to flow into the branch lines and discharge from the nozzles.

(b) Nozzles attached to the branch lines shall be full cone, corrosion resistant and provided with blow-off dust covers. The spray application rate shall not be less than 0.25 gallon per minute per square foot of the top surface of the top belt and the discharge shall be directed at both the upper and bottom surfaces of the top belt and to the upper surface of the bottom belt.

§ 75.1101-2 Installation of deluge-type sprays.

Deluge-type water spray systems shall provide protection for the belt drive and 50 feet of fire-resistant belt or 150 feet of nonfire-resistant belt adjacent to the belt drive.

§ 75.1101-3 Water requirements.

Deluge-type water spray systems shall be attached to a water supply. Water so supplied shall be free of excessive sediment and noncorrosive to the system Water pressure shall be maintained consistent with the pipe, fittings, valves, and nozzles at all times. Water systems shall include strainers with a flush-out connection and a manual shut-off valve. The water supply shall be adequate to provide flow for 10 minutes except that pressure tanks used as a source of water supply shall be of 1,000-gallon capacity for a fire-resistant belt and 3,000 gallons for a nonfire-resistant belt may be provided.

§ 75.1101-4 Branch lines.

As a part of the deluge-type water spray system, two or more branch lines of nozzles shall be installed. The maximum distance between nozzles shall not exceed 8 feet.

§ 75.1101-5 Installation of foam generator systems.

(a) Foam generator systems shall be located so as to discharge foam to the belt drive, belt takeup, electrical controls, gear reducing unit and the conveyor belt.

(b) Foam generator systems shall be equipped with a fire sensor which actuates the system, and each system shall be capable of producing and delivering the following amounts of foam within 5 minutes:

(1) At fire-resistant belt installations, an amount which will fully envelop the belt drive, belt takeup, electrical controls, gear reducing unit, and the conveyor belt over a distance of 50 feet; and,

(2) At nonfire-resistant belt installations, an amount which will fully envelop the belt drive, belt takeup electrical controls, gear reducing unit, and the conveyor belt over a distance of 150 feet.

(c) The foam generator shall be equipped with a warning device designed to stop the belt drive when a fire occurs and all such warning devices shall be capable of giving both an audible and visual signal when actuated by fire.

(d) Water, power, and chemicals required shall be adequate to maintain water or foam flow for no less than 25 minutes.

(e) Water systems shall include strainers with a flush-out connection and a manual shut-off valve.

§ 75.1101-6 Water sprinkler systems; general.

Water sprinkler systems may be installed to protect main and secondary belt-conveyor drives, however, where such systems are employed, they shall be installed and maintained in accordance with §§ 75.1101-7 through 75.1101-11.

§ 75.1101-7 Installation of water sprinkler systems; requirements.

(a) The fire-control components of each water sprinkler system shall be installed, as far as practicable in accordance with the recommendations set forth in National Fire Protection Association 1968-69 edition, Code No. 13, "Installation of Sprinkler Systems" and such systems' components shall be of a type approved by the Underwriters' Laboratories, Inc., Factory Mutual Research Corp.

(b) Each sprinkler system shall provide protection for the motor drive belt takeup, electrical controls, gear reducing unit, and the 50 feet of fire-resistant belt, or 150 feet of nonfire-resistant belt adjacent to the belt drive.

(c) The components of each water sprinkler system shall be located so as to minimize the possibility of damage by roof fall or by the moving belt and its load.

§ 75.1101-8 Water sprinkler systems; arrangement of sprinklers.

(a) At least one sprinkler shall be installed above each belt drive, belt takeup, electrical control, and gear-reducing unit, and individual sprinklers shall be installed at intervals of no more than 8 feet along all conveyor branch lines.

(b) Two or more branch lines, at least one of which shall be above the top belt and one between the top and bottom belt, shall be installed in each sprinkler system to provide a uniform discharge of water to the belt surface.

(c) The water discharge rate from the sprinkler system shall not be less than 0.25 gallon per minute per square foot of the top surface of the top belt and the discharge shall be directed at both the upper and bottom surfaces of the top belt and to the upper surface of the bottom belt. The supply of water shall be adequate to provide a constant flow of water for 10 minutes with all sprinklers functioning.

(d) Each individual sprinkler shall be activated at a temperature of not less than 150° F. and not more than 300° F.

(e) Water systems shall include strainers with a flush-out connection and a manual shut-off valve.

§ 75.1101-9 Back-up water system.

One fire hose outlet together with a length of hose capable of extending to the belt drive shall be provided within 300 feet of each belt drive.

§ 75.1101-10 Water sprinkler systems; fire warning devices at belt drives.

Each water sprinkler system shall be equipped with a device designed to stop the belt drive in the event of a rise in temperature and each such warning device shall be capable of giving both an audible and visual warning when a fire occurs.

§ 75.1101-11 Inspection of water sprinkler systems.

Each water sprinkler system shall be examined weekly and a functional test of the complete system shall be conducted at least once each year.

§ 75.1101-12 Equivalent dry-pipe system.

Where water sprinkler systems are installed to protect main and secondary belt conveyor drives and freezing temperatures prevail, an equivalent dry-pipe system may be installed.

§ 75.1101-13 Dry powder chemical systems; general.

Self-contained dry powder chemical systems may be installed to protect main and secondary belt conveyor drives, however, where such systems are employed, they shall be installed and maintained in accordance with the provisions of §§ 75.1101-14 through 75.1101-22.

§ 75.1101-14 Installation of dry powder chemical systems.

(a) Self-contained dry powder chemical systems shall be installed to protect each belt-drive, belt takeup, electrical-controls, gear reducing units and 50 feet of fire-resistant belt or 150 feet of non-fire-resistant belt adjacent to the belt drive.

(b) The fire-control components of each dry powder chemical system shall be a type approved by the Underwriters' Laboratories, Inc., or Factory Mutual Engineering Corp.

(c) The components of each dry powder chemical system shall be located so as to minimize the possibility of damage by roof fall or by the moving belt and its load.

§ 75.1101-15 Construction of dry powder chemical systems.

(a) Each self-contained dry powder system shall be equipped with hose or pipe lines which are no longer than necessary.

(b) Metal piping and/or hose between control valves and nozzles shall have a minimum bursting pressure of 500 p.s.i.g.

(c) Hose shall be protected by wire braid or its equivalent.

(d) Nozzles and reservoirs shall be sufficient in number to provide maximum protection to each belt, belt takeup, electrical controls, and gear reducing unit.

(e) Each belt shall be protected on the top surface of both the top and bottom belts and the bottom surface of the top belt.

§ 75.1101-16 Dry powder chemical systems; sensing and fire-suppression devices.

(a) Each self-contained dry powder chemical system shall be equipped with sensing devices which shall be designed to activate the fire-control system, sound an alarm and stop the conveyor drive motor in the event of a rise in temperature, and provision shall be made to minimize contamination of the lens of any optical sensing device installed in such system.

(b) Where sensors are operated from the same power source as the belt drive, each sensor shall be equipped with a standby power source which shall be capable of remaining operative for at least 4 hours after a power cutoff.

(c) Sensor systems shall include a warning indicator (or test circuit) which shows it is operative.

(d) Each fire-suppression system shall be equipped with a manually operated control valve which shall be independent of the sensor.

§ 75.1101-17 Sealing of dry powder chemical systems.

Each dry powder chemical system shall be adequately sealed to protect all components of the system from moisture dust, and dirt.

§ 75.1101-18 Dry powder requirements.

Each dry powder chemical system shall contain the following minimum amounts of multipurpose dry powder:

Belt	Dry powder, pounds
Fire resistant	125
Non-fire resistant	250

§ 75.1101-19 Nozzles; flow rate and direction.

The nozzles of each dry powder chemical system shall be capable of discharging all powder within 1 minute after actuation of the system and such nozzles shall be directed so as to minimize the effect of ventilation upon fire control.

§ 75.1101-20 Safeguards for dry powder chemical systems.

Adequate guards shall be provided along all belt conveyors in the vicinity of each dry powder chemical system to protect persons whose vision is restricted by a discharge of powder from the system. In addition, hand-rails shall be installed in such areas to provide assistance to those passing along the conveyor after a powder discharge.

§ 75.1101-21 Back-up water system.

One fire hose outlet together with a length of hose capable of extending to the belt drive shall be provided within 300 feet of each belt drive.

§ 75.1101-22 Inspection of dry powder chemical systems.

(a) Each dry powder chemical system shall be examined weekly and a functional test of the complete system shall be conducted at least once each year.

(b) Where the dry powder chemical system has been actuated, all components of the system shall be cleaned immediately by flushing all powder from pipes and hoses and all hose damaged by fire shall be replaced.

§ 75.1101-23 Program of instruction; location and use of fire fighting equipment; location of escapeways, exits and routes of travel; evacuation procedures; fire drills.

(a) Each operator of an underground coal mine shall adopt a program for the instruction of all miners in the location and use of fire fighting equipment, location of escapeways, exits, and routes of travel to the surface, and proper evacuation procedures to be followed in the event of an emergency. Such program shall be submitted for approval to the District Manager of the Coal Mine Health and Safety District in which the mine is located no later than June 30, 1974.

(1) The approved program of instruction shall include a specific fire fighting and evacuation plan designed to acquaint miners on all shifts with procedures for:

(i) Evacuation of all miners not required for fire fighting activities;

(ii) Rapid assembly and transportation of necessary men, fire suppression equipment, and rescue apparatus to the scene of the fire; and,

(iii) Operation of the fire suppression equipment available in the mine.

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(2) The approved program of instruction shall be given to all miners annually, and to newly employed miners within six months after the date of employment.

(b) In addition to the approved program of instruction required by paragraph (a) of this section, each operator of an underground coal mine shall ensure that:

(1) At least two miners in each working section on each production shift are proficient in the use of all fire suppression equipment available on such working section, and know the location of such fire suppression equipment;

(2) Each operator of attended equipment specified in § 75.1107-1(c)(1), and each miner assigned to perform job duties at the job site in the direct line of sight of attended equipment as described in § 75.1107-1(c)(2), is proficient in the use of fire suppression devices installed on such attended equipment; and,

(3) The shift foreman and at least one miner for every five miners working underground on a maintenance shift are proficient in the use of fire suppression equipment available in the mine, and know the location of such fire suppression equipment.

(c) Each operator of an underground coal mine shall require all miners to participate in fire drills, which shall be held at periods of time so as to ensure that all miners participate in such a drill no later than January 31, 1974, and at intervals of not more than 90 days thereafter.

(1) A record of such fire drills shall be kept at the mine, and shall include the date on which the drill was held, the number of persons participating, the area of the mine involved in the drill, the procedures followed, and the equipment used.

(2) For purposes of this paragraph (c), a fire drill shall consist of a simulation of the actions required by the approved fire fighting and evacuation plan described in paragraph (a)(1) of this section.

OMB CONTROL No. 1219-0054. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[38 FR 29999, Oct. 31, 1973, as amended at 47 FR 14706, Apr. 6, 1982]

EDITORIAL NOTE: A clarification notice to § 75.1101-23 was issued at 38 FR 33397, Dec. 4, 1973 and corrected at 38 FR 34873, Dec. 20, 1973.

§ 75.1102 Slippage and sequence switches.

[STATUTORY PROVISIONS]

Underground belt conveyors shall be equipped with slippage and sequence switches.

§ 75.1103 Automatic fire warning devices.

[STATUTORY PROVISIONS]

On or before May 29, 1970, devices shall be installed on all such belts which will give a warning automatically when a fire occurs on or near such belt. The Secretary shall prescribe a schedule for installing fire suppression devices on belt haulageways.

§ 75.1103-1 Automatic fire sensors.

A fire sensor system shall be installed on each underground belt conveyor. Sensors so installed shall be of a type which will (a) give warning automatically when a fire occurs on or near such belt; (b) provide both audible and visual signals that permit rapid location of the fire.

§ 75.1103-2 Automatic fire sensors; approved components; installation requirements.

(a) The components of each automatic fire sensor required to be installed in accordance with the provisions of § 75.1103-1 shall be of a type and installed in a manner approved by the Secretary, or the components shall be of a type listed, approved and installed in accordance with the recommendations of a nationally recognized testing laboratory approved by the Secretary.

(b) Where applicable, and not inconsistent with these regulations, automatic fire sensors shall be installed in accordance with the recommendations set forth in National Fire Code No. 72A "Local Protective Signaling Systems" (NFPA No. 72A-1967). National Fire Code No. 72A (1967) is hereby incorporated by reference and made a part hereof. National Fire Code No.

72A is available for examination at each Coal Mine Health and Safety District and Subdistrict Office of the Mine Safety and Health Administration, and may be obtained from the National Fire Protection Association, 60 Batterymarch Street, Boston, MA 02110.

[37 FR 16546, Aug. 16, 1972]

§ 75.1103-3 Automatic fire sensor and warning device systems; minimum requirements; general.

Automatic fire sensor and warning device systems installed in belt haulageways of underground coal mines shall be assembled from components which meet the minimum requirements set forth in §§ 75.1103-4 through 75.1103-7 unless otherwise approved by the Secretary.

[37 FR 16545, Aug. 16, 1972]

§ 75.1103-4 Automatic fire sensor and warning device systems; installation; minimum requirements.

(a) Automatic fire sensor and warning device systems shall provide identification of fire within each belt flight (each belt unit operated by a belt drive).

(1) Where used, sensors responding to temperature rise at a point (point-type sensors) shall be located at or above the elevation of the top belt, and installed at the beginning and end of each belt flight, at the belt drive, and in increments along each belt flight so that the maximum distance between sensors does not exceed 125 feet, except as provided in paragraph (a) (3) of this section.

(2) Where used, sensors responding to radiation, smoke, gases, or other indications of fire, shall be spaced at regular intervals to provide protection equivalent to point-type sensors, and installed within the time specified in paragraph (a) (3) of this section.

(3) When the distance from the tailpiece at loading points to the first outby sensor reaches 125 feet when point-type sensors are used, such sensors shall be installed and put in operation within 24 production shift hours after the distance of 125 feet is reached. When sensors of the kind described in paragraph (a) (2) of this section are used, such sensor shall be installed and put in operation within 24 production shift hours after the equivalent distance which has been established for the sensor from the tailpiece at loading points to the first outby sensor is first reached.

(b) Automatic fire sensor and warning device systems shall be installed so as to minimize the possibility of damage from roof falls and the moving belt and its load.

(c) Infrared, ultraviolet, and other sensors whose effectiveness is impaired by contamination shall be protected from dust, dirt, and moisture.

(d) The voltage of automatic fire sensor and warning device systems shall not exceed 120 volts.

(e) Except when power is required to be cut off in the mine under the provisions of § 75.321, automatic fire sensor and warning device systems shall be capable of giving warning of fire for a minimum of 4 hours after the source of power to the belt is removed unless the belt haulageway is examined for hot rollers and fire as provided in paragraph (e) (1) or (2) of this section.

(1) When an unplanned removal of power from the belt occurs an examination for hot rollers and fire in the operating belts of a conveyor system shall be completed within 2 hours after the belt has stopped.

(2) When a preplanned removal of power from the belt occurs an examination for hot rollers and fire on the operating belts of a conveyor system may commence not more than 30 minutes before the belts are stopped and shall be completed within 2 hours after the examination is commenced, or the examination shall be commenced when the belts are stopped and completed within 2 hours after the belts are stopped.

[37 FR 16545, Aug. 16, 1972]

§ 75.1103-5 Automatic fire warning devices; manual resetting.

(a) Automatic fire sensor and warning device systems shall upon activation provide an effective warning signal at either of the following locations:

(1) At all work locations where men may be endangered from a fire at the belt flight; or

(2) At a manned location where personnel have an assigned post of duty and have telephone or equivalent communication with all men who may be endangered.

The automatic fire sensor and warning device system shall be monitored for a period of 4 hours after the belt is stopped, unless an examination for hot rollers and fire is made as prescribed in § 75.1103-4(e).

(b) The fire sensor and warning device system shall include a means for rapid evaluation of electrical short and open circuits, ground faults, pneumatic leaks, or other defect detrimental to its proper operational condition.

(c) Automatic fire sensor and warning devices shall include a manual reset feature.

[37 FR 16545, Aug. 16, 1972]

§ 75.1103-6 Automatic fire sensors; actuation of fire suppression systems.

Automatic fire sensor and warning device systems may be used to actuate deluge-type water systems, foam generator systems, multipurpose dry-powder systems, or other equivalent automatic fire suppression systems.

[37 FR 16546, Aug. 16, 1972]

§ 75.1103-7 Electrical components; permissibility requirements.

The electrical components of each automatic fire sensor and warning device system shall:

(a) Remain functional when the power circuits are deenergized as required by § 75.706; and

(b) Be provided with protection against ignition of methane or coal dust when the electrical power is deenergized as required by § 75.321, but such components shall be permissible or intrinsically safe if installed in a return airway.

[37 FR 16546, Aug. 16, 1972]

§ 75.1103-8 Automatic fire sensor and warning device systems; inspection and test requirements.

(a) Automatic fire sensor and warning device systems shall be inspected weekly, and a functional test of the complete system shall be made at least once annually. Inspection and maintenance of such systems shall be by a qualified person.

(b) A record of the annual functional test conducted in accordance with paragraph (a) of this section shall be maintained by the operator. A record card of the weekly inspection shall be kept at each belt drive.

[37 FR 16546, Aug. 16, 1972]

§ 75.1103-9 Minimum requirements; fire suppression materials and location; maintenance of entries and crosscuts; access doors; communications; fire crews; high-expansion foam devices.

(a) The following materials shall be stored within 300 feet of each belt drive or at a location where the material can be moved to the belt drive within 5 minutes, except that when the ventilating current in the belt haulageway travels in the direction of the normal movement of coal on the belt, the materials shall be stored within 300 feet of the belt tailpiece or at a location where the materials can be moved to the belt tailpiece within 5 minutes.

(1) 500 feet of fire hose, except that if the belt flight is less than 500 feet in length the fire hose may be equal to the length of the belt flight. A high expansion foam device may be substituted for 300 feet of the 500 feet of the fire hose. Where used, such foam generators shall produce foam sufficient to fill 100 feet of the belt haulageway in not more than 5 minutes. Sufficient power cable and water hose shall be provided so that the foam generator can be installed at any crosscut along the belt by which the generator is located. A 1-hour supply of foam producing chemicals and tools and hardware required for its operation shall be stored at the foam generator.

(2) Tools to open a stopping between the belt entry and the adjacent intake entry; and

(3) 240 pounds of bagged rock dust.

(b) The entry containing the main waterline and the crosscuts containing water outlets between such entry and the belt haulageway (if the main waterline is in an adjacent entry) shall be maintained accessible and in safe condition for travel and firefighting activities. Each stopping in such crosscuts or adjacent crosscuts shall have an access door.

(c) Suitable communication lines extending to the surface shall be provided in the belt haulageway or adjacent entry.

(d) The fire suppression system required at the belt drive shall include the belt discharge head.

(e) A crew consisting of at least five members for each working shift shall be trained in firefighting operations. Fire drills shall be held at intervals not exceeding 6 months.

[37 FR 16546, Aug. 16, 1972]

§ 75.1103-10 Fire suppression systems; additional requirements.

Where the average air velocity along the belt haulage entry exceeds 100 feet per minute, or the belt is not fire resistant, or both, the fire suppression system in the belt haulageway shall conform with the following additional sensor and cache requirements:

(a) The maximum distance between sensors along the belt haulageway shall be 40 percent of those distances specified or established in accordance with § 75.1103-4(a) (1) or (2), as applicable, and shall be installed and put in operation within the period of time specified in § 75.1103-4(a)(3).

(b) For each conveyor belt flight exceeding 2,000 feet in length, an additional cache of the materials specified in § 75.1103-9(a) (1), (2), and (3) shall be provided. The additional cache may be stored at the locations specified in § 75.1103-9(a), or at some other strategic location readily accessible to the conveyor belt flight.

[37 FR 16546, Aug. 16, 1972]

§ 75.1103-11 Tests of fire hydrants and fire hose; record of tests.

Each fire hydrant shall be tested by opening to insure that it is in operating condition, and each fire hose shall be tested, at intervals not exceeding 1 year. A record of these tests shall be maintained at an appropriate location.

[37 FR 16546, Aug. 16, 1972]

§ 75.1104 Underground storage, lubricating oil and grease.

[STATUTORY PROVISIONS]

Underground storage places for lubricating oil and grease shall be of fireproof construction. Except for specially prepared materials approved by the Secretary, lubricating oil and grease kept in all underground areas in a coal mine shall be in fireproof, closed metal containers or other no less effective containers approved by the Secretary.

§ 75.1105 Housing of underground transformer stations, battery-charging stations, substations, compressor stations, shops, and permanent pumps.

[STATUTORY PROVISIONS]

Underground transformer stations, battery-charging stations, substations, compressor stations, shops, and permanent pumps shall be housed in fireproof structures or areas. Air currents used to ventilate structures or areas enclosing electrical installations shall be coursed directly into the return. Other underground structures installed in a coal mine as the Secretary may prescribe shall be of fireproof construction.

§ 75.1106 Welding, cutting, or soldering with arc or flame underground.

[STATUTORY PROVISIONS]

All welding, cutting, or soldering with arc or flame in all underground areas of a coal mine shall, whenever practicable, be conducted in fireproof enclosures. Welding, cutting, or soldering with arc or flame in other than a fireproof enclosure shall be done under the supervision of a qualified person who shall make a diligent search for fire during and after such operations and shall, immediately before and during such operations, continuously test for methane with means approved by the Secretary for detecting methane. Welding, cutting, or soldering shall not be conducted in air that contains 1.0 volume per centum or more of methane. Rock dust or suitable fire extinguishers shall be immediately available during such welding, cutting or soldering.

§ 75.1106-1 Test for methane.

Until December 31, 1970, a permissible flame safety lamp may be used to make tests for methane required by the regulations in this part. On and after December 31, 1970 a methane detector approved by the Secretary shall be used for such tests and a permissible flame safety lamp may be used as a supplemental testing device. A person qualified to test for methane under § 75.151 will be a qualified person for the purpose of this section.

TRANSPORTATION, HANDLING AND STORAGE OF LIQUEFIED AND NONLIQUEFIED COMPRESSED GAS CYLINDERS

§ 75.1106-2 Transportation of liquefied and nonliquefied compressed gas cylinders; requirements.

(a) Liquefied and nonliquefied compressed gas cylinders transported into or through an underground coal mine shall be:

(1) Placed securely in devices designed to hold the cylinder in place during transit on self-propelled equipment or belt conveyors;

(2) Disconnected from all hoses and gages;

(3) Equipped with a metal cap or "headband" (fence-type metal protector around the valve stem) to protect the cylinder valve during transit; and,

(4) Clearly labeled "empty" or "MT" when the gas in the cylinder has been expended.

(b) In addition to the requirements of paragraph (a) of this section, when liquefied and nonliquefied compressed gas cylinders are transported by a trolley wire haulage system into or through an underground coal mine, such cylinders shall be placed in well insulated and substantially constructed containers which are specifically designed for holding such cylinders.

(c) Liquefied and nonliquefied compressed gas cylinders shall not be transported on mantrips.

[36 FR 22061, Nov. 19, 1971]

§ 75.1106-3 Storage of liquefied and nonliquefied compressed gas cylinders; requirements.

(a) Liquefied and nonliquefied compressed gas cylinders stored in an underground coal mine shall be:

(1) Clearly marked and identified as to their contents in accordance with Department of Transportation regulations.

(2) Placed securely in storage areas designated by the operator for such purpose, and where the height of the coalbed permits, in an upright position, preferably in specially designated racks, or otherwise secured against being accidently tipped over.

(3) Protected against damage from falling material, contact with power lines and energized electrical equipment, heat from welding, cutting or soldering, and exposure to flammable liquids.

(b) Liquefied and nonliquefied compressed gas cylinders shall not be stored or left unattended in any area inby the last open crosscut of an underground coal mine.

(c) When not in use, the valves of all liquefied and nonliquefied compressed gas cylinders shall be in the closed position, and all hoses shall be removed from the cylinder.

[36 FR 22061, Nov. 19, 1971]

§ 75.1106-4 Use of liquefied and nonliquefied compressed gas cylinders; general requirements.

(a) Persons assigned by the operator to use and work with liquefied and nonliquefied compressed gas shall be trained and designated by the operator as qualified to perform the work to which they are assigned, and such qualified persons shall be specifically instructed with respect to the dangers inherent in the use of such gases in an underground coal mine.

(b) Persons who perform welding, cutting, or burning operations shall wear clothing free from excessive oil or grease.

(c) Liquefied and nonliquefied compressed gas shall be used only in well-ventilated areas.

(d) Not more than one liquefied or nonliquefied compressed gas unit, consisting of one oxygen cylinder and one additional gas cylinder, shall be used to repair any unit of equipment which is inby the loading point of any section.

(e) Where liquefied and nonliquefied compressed gas is used regularly in underground shops or other underground structures, such shops or structures shall be on a separate split of air.

(f) Where liquefied and nonliquefied compressed gas is used in any area in which oil, grease, or coal dust is present, oil and grease deposits shall, where practicable, be removed and the entire area within 10 feet of the worksite covered with a heavy coating of rock dust.

(g) Liquefied and nonliquefied compressed gas cylinders shall be located no less than 10 feet from the worksite, and where the height of the coal seam permits, they shall be placed in an upright position and chained or otherwise secured against falling.

(h) Liquefied and nonliquefied compressed gas shall not be used under direct pressure from the cylinder and, where such gases are used under reduced pressure, the pressure level shall not exceed that recommended by the manufacturer.

(i) "Manifolding cylinders" shall only be performed in well-ventilated shops where the necessary equipment is properly installed and operated in accordance with specifications for safety prescribed by the manufacturer.

[36 FR 22061, Nov. 19, 1971]

§ 75.1106-5 Maintenance and tests of liquefied and nonliquefied compressed gas cylinders; accessories and equipment; requirements.

(a) Hose lines, gages, and other cylinder accessories shall be maintained in a safe operating condition.

(b) Defective cylinders, cylinder accessories, torches, and other welding, cutting, and burning equipment shall be labeled "defective" and taken out of service.

(c) Each qualified person assigned to perform welding, cutting, or burning with liquefied and nonliquefied compressed gas shall be equipped with a wrench specifically designed for use with liquefied and nonliquefied compressed gas cylinders and a suitable torchtip cleaner to maintain torches in a safe operating condition.

(d) Tests for leaks on the hose valves or gages of liquefied and nonliquefied compressed gas cylinders shall only be made with a soft brush and soapy water or soap suds, or other device approved by the Secretary.

[36 FR 22062, Nov. 19, 1971]

§ 75.1106-6 Exemption of small low pressure gas cylinders containing nonflammable or nonexplosive gas mixtures.

Small low pressure gas cylinders containing nonflammable or nonexplosive gas mixtures, which provide for the emission of such gas under a pressure reduced from a pressure which does not exceed 250 p.s.i.g., and which is manufactured and sold in conformance with U.S. Department of Transportation Special Permit No. 6029 as a calibration test kit for methane monitoring systems, shall be exempt from the requirements of §§ 75.1106-2(c) and 75.1106-4(d), (f) and (g).

[36 FR 22062, Nov. 19, 1971]

FIRE SUPPRESSION DEVICES AND FIRE-RESISTANT HYDRAULIC FLUIDS ON UNDERGROUND EQUIPMENT

§ 75.1107 Fire suppression devices.

[STATUTORY PROVISIONS]

On and after March 30, 1971, fire-suppression devices meeting specifications prescribed by the Secretary shall be installed on unattended underground equipment and suitable fire-resistant hydraulic fluids approved by the Secretary shall be used in the hydraulic systems of such equipment. Such fluids shall be used in the hydraulic systems of other underground equipment unless fire suppression devices meeting specifications prescribed by the Secretary are installed on such equipment.

§ 75.1107-1 Fire-resistant hydraulic fluids and fire suppression devices on underground equipment.

(a)(1) Unattended electrically powered equipment used underground which uses hydraulic fluid shall use approved fire-resistant hydraulic fluid.

(2) Except as provided in paragraph (a) (3) of this section, within 24 production shift hours after being installed, unattended electrically powered equipment used underground shall be equipped with a fire suppression device which meets the applicable requirements of §§ 75.1107-3 through 75.1107-16.

(3) Unattended enclosed motors, controls, transformers, rectifiers, and other similar noncombustible electrically powered equipment containing no flammable fluid may be protected:

(i) By an approved fire suppression device, or

(ii) Be located at least 2 feet from coal or other combustible materials, or

(iii) Be separated from the coal or combustible materials by a 4-inch-thick masonry firewall or equivalent; and be mounted on a minimum 4-inch-thick noncombustible surface, platform, or equivalent The electrical cables at such equipment shall conform with the requirements of Part 18 of this chapter (Bureau of Mines Schedule 2G) or be in metal conduit.

(b) Attended electrically powered equipment used underground which uses hydraulic fluid shall use approved fire-resistant hydraulic fluid unless such equipment is protected by a fire suppression device which meets the applicable requirements of §§ 75.1107-3—75.1107-16.

(c) For purpose of §§ 75.1107—75.1107-16 the following underground equipment shall be considered attended equipment:

(1) Any machine or device regularly operated by a miner assigned to operate such machine or device;

(2) Any machine or device which is mounted in the direct line of sight of a jobsite which is located within 500 feet of such machine or device and which jobsite is regularly occupied by a miner assigned to perform job duties at such jobsite during each production shift.

(d) Machines and devices described under paragraph (c) of this section must be inspected for fire and the input powerline deenergized when workmen leave the area for more than 30 minutes.

[37 FR 15301, July 29, 1972]

§ 75.1107-2 Approved fire-resistant hydraulic fluids; minimum requirements.

Fire-resistant hydraulic fluids and concentrates required to be employed in the hydraulic system of underground equipment in accordance with the provisions of § 75.1107-1 shall be considered suitable only if they have been produced under an approval, or any modification thereof, issued pursuant to Part 35 Subchapter I of this chapter (Bureau of Mines Schedule 30), or any revision thereof.

[37 FR 15301, July 29, 1972]

§ 75.1107-3 Fire suppression devices; approved components; installation requirements.

(a) The components of each fire suppression device required to be installed in accordance with the provisions of § 75.1107-1 shall be approved by the Secretary, or where appropriate be listed as approved by a nationally recognized agency approved by the Secretary.

(b) Where used, pressure vessels shall conform with the requirements of sections 3603, 3606, 3607, 3707, and 3708 of National Fire Code No. 22 "Water Tanks for Private Fire Protection" (NFPA No. 22-1971).

(c) The cover of hose of fire suppression devices, if used on the protected equipment and installed after the effective date of this section, shall meet the flame-resistant requirements of Part 18 of this chapter (Bureau of Mines Schedule 2G).

(d) Fire suppression devices required to be installed in accordance with the provisions of § 75.1107-1 shall where appropriate be installed in accordance with the manufacturer's specifications.

[37 FR 15301, July 29, 1972]

§ 75.1107-4 Automatic fire sensors and manual actuators; installation; minimum requirements.

(a) (1) Where fire suppression devices are installed on unattended underground equipment, one or more point-type sensors or equivalent shall be installed for each 50 square feet of top surface area, or fraction thereof, of such equipment, and each sensor shall be designed to activate the first suppression system and disconnect the electrical power source to the equipment protected, and, except where sprinklers are used, there shall be in addition, a manual actuator installed to operate the system. Where sprinklers are used, provision shall be made for manual application of water to the protected equipment in lieu of a manual actuator.

(2) Two or more manual actuators, where practicable, shall be installed, as provided in paragraphs (a)(2)(i) and (ii) of this section, to activate fire suppression devices on attended equipment purchased on or after the effective date of this § 75.1107-4. At least one manual actuator shall be used on equipment purchased prior to the effective date of this § 75.1107-4.

(i) Manual actuators installed on attended equipment regularly operated by a miner, as provided in § 75.1107-1(c)(1) shall be located at different locations on the equipment, and at least one manual actuator shall be located within easy reach of the operator's normal operating position.

(ii) Manual actuators to activate fire suppression devices on attended equipment not regularly operated by a miner, as provided in § 75.1107-1(c)(2), shall be installed at different location, and at least one manual actuator shall be installed so as to be easily reached by the miner at the jobsite or by persons approaching the equipment.

(b) Sensors shall, where practicable, be installed in accordance with the recommendations set forth in National Fire Code No. 72A "Local Protective Signaling Systems" (NFPA No. 72A-1967).

(c) On unattended equipment the fire suppression device shall operate independently of the power to the main motor (or equivalent) so it will remain operative if the circuit breakers (or other protective device) actuates. On attended equipment powered through a trailing cable the fire suppression device shall operate independently of the electrical power provided by the cable.

(d) Point-type sensors (such as thermocouple, bimetallic strip, or rate of temperature rise) located in ventilated passageways shall be installed downwind from the equipment to be protected.

(e) Sensor systems shall include a device or method for determining their operative condition.

[37 FR 15301, July 29, 1972]

§ 75.1107-5 Electrical components of fire suppression devices; permissibility requirements.

The electrical components of each fire suppression device used on permissible equipment inby the last open crosscut or on equipment in the return airways of any coal mine shall be permissible or intrinsically safe and such components shall be maintained in permissible or intrinsically safe condition.

[37 FR 15302, July 29, 1972]

§ 75.1107-6 Capacity of fire suppression devices; location and direction of nozzles.

(a) Each fire suppression device shall be:

(1) Adequate in size and capacity to extinguish potential fires in or on the equipment protected; and

(2) Suitable for the atmospheric conditions surrounding the equipment protected (e.g., air velocity, type, and proximity of adjacent combustible material); and

(3) Rugged enough to withstand rough usage and vibration when installed on mining equipment.

(b) The extinguishant-discharge nozzles of each fire suppression device shall, where practicable, be located so as to take advantage of mine ventilation air currents. The fire suppression device may be of the internal injection, inundating, or combination type. Where fire control is achieved by internal injection, or combination of internal injection and inundation, hazardous locations shall be enclosed to minimize runoff and overshoot of the extinguishing agent and the extinguishing agent shall be directed onto:

(1) Cable reel compartments and electrical cables on the equipment which are subject to flexing or to external damage; and

(2) All hydraulic components on the equipment which are exposed directly

to or located in the immediate vicinity of electrical cables which are subject to flexing or to damage.

[37 FR 15302, July 29, 1972]

§ 75.1107-7 Water spray devices; capacity; water supply; minimum requirements.

(a) Where water spray devices are used on unattended underground equipment the rate of flow shall be at least 0.25 gallon per minute per square foot over the top surface area of the equipment and the supply of water shall be adequate to provide the required flow of water for 10 minutes.

(b) Where water spray devices are used for inundating attended underground equipment the rate of flow shall be at least 0.18 gallon per minute per square foot over the top surface area of the equipment (excluding conveyors, cutters, and gathering heads), and the supply of water shall be adequate to provide the required flow of water for 10 minutes.

(c) Where water is used for internal injection on attended equipment the total quantity of water shall be at least 4.5 gallons times the number of hazardous locations; however, the total minimum amount of water shall not be less than the following:

Type of equipment	Water in gallons
(1) Cutting machines	36
(2) Continuous miners	36
(3) Haulage vehicles	22.5
(4) All other attended equipment	18.0

The rate of flow shall be not less than 7 gallons per minute.

(d) Where water is used in a combination internal injection and inundation system on attended equipment the rate of flow shall be at least 0.12 gallon per minute per square foot over the top surface area of the equipment (excluding conveyors, cutters, and gathering heads), and the supply of water shall be adequate to provide the required flow of water for 10 minutes.

(e) On equipment provided with a cable reel and an internal injection or combination-type system, the amount of water discharged into the cable reel compartments shall be approximately 25 percent of the amount required to be discharged by the system, however, such quantity need not exceed 10 gallons.

(f) Liquid chemicals may be used, as approved by the Secretary in self-contained fire suppression devices. Such liquid chemicals shall be nontoxic and when applied to a fire shall not produce excessive toxic compounds. The quantity of liquid chemicals required shall be proportionately less than water as based on equivalency ratings established by the Secretary or equivalency ratings made by a nationally recognized agency approved by the Secretary.

[37 FR 15302, July 29, 1972]

§ 75.1107-8 Fire suppression devices; extinguishant supply systems.

(a) Fire suppression systems using water or liquid chemical to protect attended equipment shall:

(1) Be maintained at a pressure consistent with the pipe, fittings, valves, and nozzles used in the system.

(2) Be located so as to be protected against damage during operation of the equipment protected.

(3) Employ liquid which is free from excessive sediment and noncorrosive to the system.

(4) Include strainers equipped with flush-out connections or equivalent protective devices and a rising stem or other visual indicator-type shutoff valve.

(b) Water supplies for fire suppression devices installed on underground equipment may be maintained in mounted water tanks or by connection to water mains. Such water supplies shall be continuously connected to the fire suppression device whenever the equipment is connected to a power source, except for a reasonable time for changing hose connections to hydrants while the machine is stopped in a ventilated passageway.

[37 FR 15302, July 29, 1972]

§ 75.1107-9 Dry chemical devices; capacity; minimum requirements.

(a) Dry chemical fire extinguishing systems used on underground equipment shall be of the multipurpose powder-type and shall include the following:

(1) The system including all hose and nozzles shall be protected against the entrance of moisture, dust, or dirt;

(2) The system shall be guarded against damage during operation of the equipment protected;

(3) Hose and pipe shall be as short as possible; the distance between the chemical container and furthest nozzle shall not exceed 50 feet;

(4) Hose, piping, and fittings between the actuator and the chemical container shall have a bursting pressure of 500 pounds per square inch (gage) or higher; the hose, piping, and fittings between the chemical container and the nozzles shall have a bursting pressure of 300 pounds per square inch (gage) or higher and

(5) The system shall discharge in 1 minute or less, for quantities less than 50 pounds (nominal)[1] and in less than 2 minutes for quantities more than 50 pounds;

(b) On unattended underground equipment, the number of pounds of dry chemical employed by the system shall be not less than 1 pound per square foot of top surface area of the equipment; however, the minimum amount in any system shall be 20 pounds (nominal). The discharge shall be directed into and on potentially hazardous locations of the equipment.

(c) On attended underground equipment, the number of pounds (nominal) employed by the system shall equal 5 times the total number of hazardous locations; however, the minimum amount in any system shall not be less than the following, except that systems on haulage vehicles installed prior to the effective date of this section may contain 20 pounds (nominal).

Type of equipment	Dry chemical pounds (nominal)
(1) Cutting machines	40
(2) Continuous miners	40
(3) Haulage vehicles	30
(4) All other attended equipment	20

(d) The amount of dry chemical discharged into the cable reel compartments of attended underground equipment shall be approximately 25 percent of the total amount required to be discharged by the system; however, the quantity discharged into cable reel compartments need not exceed 10 pounds.

[37 FR 15302, July 29, 1972]

§ 75.1107-10 High expansion foam devices; minimum capacity.

(a) On unattended underground equipment the amount of water delivered as high expansion foam for a period of approximately 20 minutes shall be not less than 0.06 gallon per minute per square foot of surface area of the equipment protected; however, the minimum total rate for any system shall be not less than 3 gallons per minute.

(b) On attended underground equipment, foam may be delivered by internal injection, inundation, or combination-type systems. Each system shall deliver water as foam for a minimum of 10 minutes. For internal injection, the rate of water application as high expansion foam shall be not less than 0.5 gallon per minute per hazardous location; however, the minimum total rate shall be not less than 2 gallons per minute. For inundation, the rate of water application as high expansion foam shall be not less than 0.05 gallon per minute per square foot of top surface area of the equipment protected; however, the minimum total rate shall be not less than 5 gallons of water per minute.

(c) In combined internal injection and inundation systems the rate of water applied as foam shall not be less than 0.035 gallon per minute per square foot of top surface area of the equipment protected; however, the minimum total rate shall not be less than 3.5 gallons of water per minute.

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[1] Many dry chemical systems were originally designed for sodium bicarbonate before all-purpose chemical (ammonium phosphate) was shown to be more effective. Sodium bicarbonate is denser than ammonium phosphate; hence, for example, a 50-pound system designed for the sodium bicarbonate will hold slightly more by weight than all-purpose dry chemical (ammonium phosphate) by weight. The word "nominal" is used in § 75.1107-9 to express the approximate weight in pounds of all-purpose dry chemical.

(d) Where internal injection is employed, the amount of water discharged as high expansion foam into the cable reel compartments of underground equipment regularly operated by a miner shall be approximately 25 percent of the total amount required to be discharged by the system; however, the quantity of water discharged as foam into the cable reel compartment need not exceed 1.5 gallons.

[37 FR 15303, July 29, 1972]

§ 75.1107-11 Extinguishing agents; requirements on mining equipment employed in low coal.

On mining equipment no more than 32 inches high, the quantity of extinguishing agent required under the provisions of §§ 75.1107-7, 75.1107-9, and 75.1107-10 may be reduced by one-fourth if space limitations on the equipment require such reduction.

[37 FR 15303, July 29, 1972]

§ 75.1107-12 Inerting of mine atmosphere prohibited.

No fire suppression device designed to control fire by total flooding shall be installed to protect unattended underground equipment except in enclosed dead-end entries or enclosed rooms.

[37 FR 15303, July 29, 1972]

§ 75.1107-13 Approval of other fire suppression devices.

Notwithstanding the provisions of §§ 75.1107-1 through 75.1107-12 the District Manager for the District in which the mine is located may approve any other fire suppression system or device which provides substantially equivalent protection as would be achieved through compliance with those sections: *Provided*, That no such system or device shall be approved which does not meet the following minimum criteria:

(a) Components shall be approved by the Secretary, or where appropriate be listed as approved by a nationally recognized agency approved by the Secretary.

(b) The fire suppression equipment shall be designed to withstand the rigors of the mine environment. Where used, pressure vessels shall conform with the requirements of section 3603, 3606, 3607, 3707, and 3708 of National Fire Code No. 22 "Water Tanks for Private Fire Protection" (NFPA No. 22-1971).

(c) The cover of hose of fire suppression devices, if used on the protected equipment, shall meet the flame-resistant requirements of Part 18 of this chapter (Bureau of Mines Schedule 2G).

(d) Extinguishing agents shall not create a serious toxic or other hazard to the miners.

(e) The electrical components of the fire suppression device shall meet the requirements for electrical components of the mining machine.

(f) Where used, manual actuators for initiating the operation of the fire suppression device shall be readily accessible to the machine operator. On unattended equipment, an automatic as well as a manual actuator shall be provided.

(g) On unattended equipment the fire suppression device shall operate independently of the power to the main motor (or equivalent) so it will remain operative if the circuit breakers (or other protective device) actuates. On attended equipment powered through a trailing cable the fire suppression device shall operate independently of the electrical power provided by the cable.

(h) On unattended equipment, the sensor system shall have a means for checking its operative condition.

(i) The fire suppression agent shall be directed at locations where the greatest potential fire hazard exists. Cable reel compartments shall receive approximately twice the quantity of extinguishing agent as each other hazardous location.

(j) The rate of application of the fire suppression agent shall minimize the time for quenching and the total quantity applied shall be sufficient to quench a fire in its incipient stage.

(k) The effectiveness of the quenching agent, together with the total quantity of agent and its rate of application shall provide equivalent protection to the water, dry powder, or foam systems described in §§ 75.1107-7, 75.1107-9, and 75.1107-10.

(l) The fire suppression device shall be operable at all times electrical power is connected to the mining machine, except during tramming when the machine is in a ventilated passageway, the water hose if used, may be switched from one hydrant to another in a reasonable time and except in systems meeting the minimum special criteria set forth in paragraph (m) of this section.

(m) Systems for attended equipment which are not continuously connected to a water supply shall not be approved unless they meet the following minimum criteria:

(1) The machine shall be equipped with a firehose at least 50 feet in length which is continuously connected to the machine-mounted portion of the system.

(2) Hydrants in proximity to the area where the machine is to be used shall be equipped with sufficient hose to reach the machine at any time it is connected to a power source.

(3) The machine shall be used only where the operator (or other person) will always be in ventilated air uncontaminated by smoke and hot gases from the machine fire while extending the machine-mounted hose to connect with the hydrant-mounted hose.

(4) The machine and hydrant hoses shall be readily accessible so that the connection between the machine-mounted hose and the hydrant hose can be made and water flow achieved in not more than 3 minutes under actual mining conditions for any location of the machine while electric power is connected.

(5) The rate of water flow at the machine shall provide a minimum of 0.12 gallon of water per minute per square foot of top surface area (excluding conveyors, cutters, and gathering heads). The water shall discharge to all hazardous locations on the machine.

(6) Hose, if used on the machine, in addition to meeting the flame resistant requirements for the cover of a hose provided in §§ 75.1107-3(b) and 75.1107-13(c) shall have a minimum burst pressure 4 times that of the static water pressure at the mining machine. Fabric braid hose shall have at least two braids, and wire braid hose shall have at least a single braid.

(7) In addition to the hose located at the hydrant (which is intended to be connected to the hose on the machine) the firefighting equipment required by § 75.1100-2(a) shall be maintained.

(8) A sufficient number of trained miners shall be kept on the section when the machine is in use to connect the machine hose to the hydrant hose and achieve water flow in not more than 3 minutes.

[37 FR 15303, July 29, 1972]

§ 75.1107-14 Guards and handrails; requirements where fire suppression devices are employed.

All unattended underground equipment provided with fire suppression devices which are mounted in dead end entries, enclosed rooms or other potentially hazardous locations shall be equipped with adequate guards at moving or rotating components. Handrails or other effective protective devices shall be installed at such locations where necessary to facilitate rapid egress from the area surrounding such equipment.

[37 FR 15303, July 29, 1972]

§ 75.1107-15 Fire suppression devices; hazards; training of miners.

Each operator shall instruct all miners normally assigned to the active workings of the mine with respect to any hazards inherent in the operation of all fire suppression devices installed in accordance with § 75.1107-1 and, where appropriate, the safeguards available at each such installation.

[37 FR 15303, July 29, 1972]

§ 75.1107-16 Inspection of fire suppression devices.

(a) All fire suppression devices shall be visually inspected at least once each week by a person qualified to make such inspections.

(b) Each fire suppression device shall be tested and maintained in accordance with the requirements specified in the appropriate National Fire Code listed as follows for the type and kind of device used:

National Fire Code No. 11A "High Expansion Foam Systems" (NFPA No. 11A—1970).

National Fire Code No. 13A "Care and Maintenance of Sprinkler Systems" (NFPA No. 13A—1971).

National Fire Code No. 15 "Water Spray Fixed Systems for Fire Protection" (NFPA No. 15—1969).

National Fire Code No. 17 "Dry Chemical Extinguishing Systems" (NFPA No. 17—1969).

National Fire Code No. 72A "Local Protective Signaling Systems" (NFPA No. 72A—1967).

National Fire Code No. 198 "Care of Fire Hose" (NFPA No. 198—1969).

(c) A record of the inspections required by this section shall be maintained by the operator. The record of the weekly inspections may be maintained at an appropriate location by each fire suppression device.

OMB CONTROL No. 1219-0027. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[37 FR 15304, July 29, 1972, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.1107-17 Incorporation by reference; availability of publications.

In accordance with 5 U.S.C. 552(a), the technical publications to which reference is made in §§ 75.1107-1 through 75.1107-16, and which have been prepared by organizations other than the Bureau of Mines or the Mine Safety and Health Administration, are hereby incorporated by reference and made a part hereof. The incorporated publications are available for examination at each Coal Mine Health and Safety District and Subdistrict Office of the Mine Safety and Health Administration. National Fire Codes are available from the National Fire Protection Association, 60 Batterymarch Street, Boston, MA 02110.

[37 FR 15304, July 29, 1972]

§ 75.1108 Flame-resistant conveyor belts.

[STATUTORY PROVISIONS]

On and after March 30, 1970, all conveyor belts acquired for use underground shall meet the requirements to be established by the Secretary for flame-resistant conveyor belts.

§ 75.1108-1 Approved conveyor belts.

Conveyor belts which have been approved as flame-resistant by the Bureau of Mines under Part 18 of this chapter (Bureau of Mines Schedule 2G) meet the requirements of § 75.1108.

Subpart M—Maps

§ 75.1200 Mine map.

[STATUTORY PROVISIONS]

The operator of a coal mine shall have in a fireproof repository located in an area on the surface of the mine chosen by the mine operator to minimize the danger of destruction by fire or other hazard, an accurate and up-to-date map of such mine drawn on scale. Such map shall show:

(a) The active workings;

(b) All pillared, worked out, and abandoned areas, except as provided in this section;

(c) Entries and aircourses with the direction of airflow indicated by arrows;

(d) Contour lines of all elevations;

(e) Elevations of all main and cross or side entries;

(f) Dip of the coalbed;

(g) Escapeways;

(h) Adjacent mine workings within 1,000 feet;

(i) Mines above or below;

(j) Water pools above; and

(k) Either producing or abandoned oil and gas wells located within 500 feet of such mine and any underground area of such mine; and,

(l) Such other information as the Secretary may require. Such map shall identify those areas of the mine which have been pillared, worked out, or abandoned, which are inaccessible or cannot be entered safely and on which no information is available.

§ 75.1200-1 Additional information on mine map.

Additional information required to be shown on mine maps under § 75.1200 shall include the following:

(a) Name and address of the mine;

(b) The scale and orientation of the map;

(c) The property or boundary lines of the mine;

(d) All drill holes that penetrate the coalbed being mined;

(e) All shaft, slope, drift, and tunnel openings and auger and strip mined areas of the coalbed being mined;

(f) The location of all surface mine ventilation fans; the location may be designated on the mine map by symbols;

(g) The location of railroad tracks and public highways leading to the mine, and mine buildings of a permanent nature with identifying names shown;

(h) The location and description of at least two permanent base line points coordinated with the underground and surface mine traverses, and the location and description of at least two permanent elevation bench marks used in connection with establishing or referencing mine elevation surveys;

(i) The location of any body of water dammed in the mine or held back in any portion of the mine; provided, however, such bodies of water may be shown on overlays or tracings attached to the mine maps used to show contour lines as provided under paragraph (m) of this section;

(j) The elevations of tops and bottoms of shafts and slopes, and the floor at the entrance to drift and tunnel openings;

(k) The elevation of the floor at intervals of not more than 200 feet in:

(1) At least one entry of each working section, and main and cross entries;

(2) The last line of open crosscuts of each working section, and main and cross entries before such sections and main and cross entries are abandoned;

(3) Rooms advancing toward or adjacent to property or boundary lines or adjacent mines;

(l) The elevation of any body of water dammed in the mine or held back in any portion of the mine; and,

(m) Contour lines passing through whole number elevations of the coalbed being mined. The spacing of such lines shall not exceed 10-foot elevation levels, except that a broader spacing of contour lines may be approved by the District Manager for steeply-pitching coalbeds. Contour lines may be placed on overlays or tracings attached to mine maps.

§ 75.1200-2 Accuracy and scale of mine maps.

(a) The scale of mine maps submitted to the Secretary shall not be less than 100 or more than 500 feet to the inch.

(b) Mine traverses shall be advanced by closed loop methods of traversing or other equally accurate methods of traversing.

§ 75.1201 Certification.

[STATUTORY PROVISIONS]

Such map shall be made or certified by a registered engineer or a registered surveyor of the State in which the mine is located.

§ 75.1202 Temporary notations, revisions, and supplements.

[STATUTORY PROVISIONS]

Such map shall be kept up-to-date by temporary notations and such map shall be revised and supplemented at intervals prescribed by the Secretary on the basis of a survey made or certified by such engineer or surveyor.

§ 75.1202-1 Temporary notations, revisions, and supplements.

(a) Mine maps shall be revised and supplemented at intervals of not more than 6 months.

(b) Temporary notations shall include:

(1) The location of each working face of each working place;

(2) Pillars mined or other such second mining;

(3) Permanent ventilation controls constructed or removed, such as seals, overcasts, undercasts, regulators, and permanent stoppings, and the direction of air currents indicated;

(4) Escapeways designated by means of symbols.

§ 75.1203 Availability of mine map.

[STATUTORY PROVISIONS]

The coal mine map and any revision and supplement thereof shall be available for inspection by the Secretary or his authorized representative, by coal mine inspectors of the State in which the mine is located, by miners in the mine and their representatives and by operators of adjacent coal mines and by persons owning, leasing, or residing on surface areas of such mines or areas adjacent to such mines. The operator shall furnish to the Secretary or his authorized representative and to the Secretary of Housing and Urban Development, upon request, one or more copies of such maps and any revision and supplement thereof. Such map or revision and supplement thereof shall be kept confidential and its contents shall not be divulged to any other person, except to the extent necessary to carry out the provisions of this Act and in connection with the functions and responsibilities of the Secretary of Housing and Urban Development.

§ 75.1204 Mine closure; filing of map with Secretary.

[STATUTORY PROVISIONS]

Whenever an operator permanently closes or abandons a coal mine, or temporarily closes a coal mine for a period of more than 90 days, he shall promptly notify the Secretary of such closure. Within 60 days of the permanent closure or abandonment of the mine, or, when the mine is temporarily closed, upon the expiration of a period of 90 days from the date of closure, the operator shall file with the Secretary a copy of the mine map revised and supplemented to the date of the closure. Such copy of the mine map shall be certified by a registered surveyor or registered engineer of the State in which the mine is located and shall be available for public inspection.

OMB CONTROL No. 1219-0073. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982]

§ 75.1204-1 Places to give notice and file maps.

Operators shall give notice of mine closures and file copies of maps with the Coal Mine Safety District Office for the district in which the mine is located.

OMB CONTROL No. 1219-0073. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982]

Subpart N—Blasting and Explosives

§ 75.1300 Black blasting powder; mudcaps.

[STATUTORY PROVISIONS]

Black blasting powder shall not be stored or used underground. Mudcaps (adobes) or other unconfined shots shall not be fired underground.

§ 75.1301 Separate containers for explosives and detonators.

[STATUTORY PROVISIONS]

Explosives and detonators shall be kept in separate containers until immediately before blasting.

§ 75.1302 Blasting in underground anthracite mines.

[STATUTORY PROVISIONS]

In underground anthracite mines:

(a) Mudcaps or other open, unconfined shake shots may be fired, if restricted to battery starting when methane or a fire hazard is not present, and if it is otherwise impracticable to start the battery;

(b) Open unconfined shake shots in pitching veins may be fired, when no methane or fire hazard is present, if the taking down of loose-hanging coal by other means is too hazardous; and

(c) Tests for methane shall be made immediately before such shots are fired and if 1.0 volume per centum or more of methane is present, when tested, such shot shall not be made until the methane content is reduced below 1.0 volume per centum.

§ 75.1303 Permissible explosives, detonators, blasting devices and shot-firing units; stemming boreholes.

[STATUTORY PROVISIONS]

Except as provided in this section, in all underground areas of a coal mine only permissible explosives, electric detonators of proper strength, and permissible blasting devices shall be used and all explosives and blasting devices shall be used in a permissible manner. Permissible explosives shall be fired only with permissible shot firing units. Only incombustible materials shall be used for stemming boreholes. The Secretary may under such safeguards as he may prescribe, permit the firing of more than 20 shots and allow the use of nonpermissible explosives in sinking shafts and slopes from the surface in rock. Nothing in this subpart shall prohibit the use of compressed air blasting.

§ 75.1303-1 Use of nonpermissible shot-firing units; permits for use; procedures and safeguards.

(a) Where the Coal Mine Health and Safety District Manager has determined that the firing of more than 20 shots of permissible explosives will be necessary to reduce the overall hazard to which miners are exposed during underground blasting, he may, in writing, permit the use of nonpermissible shot-firing units if he finds that a permissible shot-firing unit does not have adequate blasting capacity and that the use of such permissible units will create any of the following development or construction hazards.

(1) Exposure to disturbed roof in an adjacent cavity while scaling and supporting the remaining roof prior to wiring a new series of shots;

(2) Exposure to underburden shots where prior shots have removed the burden adjacent to a remaining borehole:

(3) Exposure to an unsupported roof while redrilling large fragmented roof rock following the loss of predrilled boreholes during earlier blasting operations; and,

(4) Any other hazard created by the use of permissible shot-firing units during underground development or construction.

(b) Applications for permits for the use of nonpermissible shot-firing units shall be submitted in writing to the Coal Mine Health and Safety District Manager for the district in which the mine is located and shall contain the following information:

(1) The name and address of the mine;

(2) The active workings in the mine in which such units will be used and the approximate number of shots to be fired;

(3) The period during which such units are to be used;

(4) The nature of the development or construction for which they will be used, e.g., overcasts, undercasts, track grading, roof brushing or boomholes;

(5) A plan, proposed by the operator designed to protect miners in the mine from the hazards of methane and other explosive gases during each multiple shot, e.g., changes in the mine ventilation system, provisions for auxiliary ventilation and any other safeguards necessary to minimize such hazards.

(6) A statement of the specific hazards anticipated by the operator in blasting for overcasts, undercasts, track grading, brushing of roof, boomholes or other unusual blasting situations such as coalbeds of abnormal thickness.

(7) The method to be employed in the use of nonpermissible shot-firing units to avoid the dangers anticipated during development or construction which will ensure the protection of life and the prevention of injuries to the miners exposed to such underground blasting.

(c)(1) Permits for the use of nonpermissible shot-firing units shall be issued on a mine-by-mine basis for periods of time to be specified by the District Manager.

(2) Permits issued under the provisions of this § 75.1303-1 shall specify and include as a condition of their use, any safeguards, in addition to those proposed by the operator, which the Health and Safety District Manager issuing such permit has determined will be required to safeguard the welfare of the miners employed in the mine at the time of the blasting permitted.

OMB CONTROL No. 1219-0025. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982]

§ 75.1304 Persons carrying explosives or detonators underground.

[STATUTORY PROVISIONS]

Explosives or detonators carried anywhere underground in a coal mine by any person shall be in containers constructed of nonconductive material, maintained in good condition, and kept closed.

§ 75.1305 Transporting explosives or detonators.

[STATUTORY PROVISIONS]

Explosives or detonators shall be transported in special closed containers:

(a) In cars moved by means of a locomotive or rope;

(b) On belts;

(c) In shuttle cars; or

(d) In equipment designed especially to transport such explosives or detonators.

§ 75.1306 Storage of explosives and detonators underground for one or more working sections.

[STATUORY PROVISIONS]

When supplies of explosives and detonators for use in one or more working sections are stored underground, they shall be kept in section boxes or magazines of substantial construction with no metal exposed on the inside, located at least 25 feet from roadways and power wires, and in a dry, well rock-dusted location protected from falls of roof, except in pitching beds, where it is not possible to comply with the location requirement, such boxes shall be placed in niches cut into the solid coal or rock.

§ 75.1307 Storage of explosives and detonators in underground working places.

[STATUTORY PROVISIONS]

Explosives and detonators stored in the working places shall be kept in separate closed containers which shall be located out of the line of blast and not less than 50 feet from the working face and 15 feet from any pipeline, powerline, rail, or conveyor, except that, if kept in niches in the rib, the distance from any pipeline, powerline, rail, or conveyor shall be at least 5 feet. Such explosives and detonators, when stored, shall be separated by a distance of at least 5 feet.

§ 75.1308 Examinations for fires after blasting.

[STATUTORY PROVISIONS]

After every blasting operation, an examination shall be made to determine whether fires have been started.

Subpart O—Hoisting and Mantrips

§ 75.1400 Hoisting equipment; general.

[STATUTORY PROVISIONS]

Every hoist used to transport persons at a coal mine shall be equipped with overspeed, overwind, and automatic stop controls. Every hoist-handling platforms, cages, or other devices used to transport persons shall be equipped with brakes capable of stopping the fully loaded platform, cage, or other device; with hoisting cable adequately strong to sustain the fully loaded platform, cage, or other device; and have a proper margin of safety. Cages, platforms, or other devices which are used to transport persons in shafts and slopes shall be equipped with safety catches or other no less effective devices approved by the Secretary that act quickly and effectively in an emergency, and such catches shall be tested at least once every 2 months. Hoisting equipment, including automatic elevators, that is used to transport persons shall be examined daily. Where persons are transported into, or out of, a coal mine by hoists, a qualified hoisting engineer shall be on duty while any person is underground, except that no such engineer shall be required for automatically operated cages, platforms, or elevators.

§ 75.1400-1 Hoists; brakes, capability.

Brakes on hoists used to transport persons shall be capable of stopping and holding the fully loaded platform, cage, or other device at any point in the shaft, slope, or incline.

§ 75.1400-2 Hoists; tests of safety catches; records.

A record shall be made in a book of the tests, required by § 75.1400, of the safety catches or other devices approved by the Secretary. Each entry shall be signed by the person making the tests and countersigned by a responsible official.

§ 75.1400-3 Daily examination of hoisting equipment.

The daily examination required by § 75.1400, of hoisting equipment, including automatic elevators shall include but not be limited to the following:

(a) A visual examination of the rope for wear, broken wires, and corrosion, especially at excessive strain points, such as near the attachments, where the rope rests on the sheaves and where the rope leaves the drum at both ends.

(b) An examination of the rope fastenings for defects.

(c) An examination of safety catches.

(d) An examination of the cage, platforms, elevators, or other devices for loose, missing, or defective parts.

(e) An examination of the head sheaves to check for broken flanges, defective bearings, rope alignment, and proper lubrication.

(f) An observation of the lining and all other equipment and appurtenances installed in the shaft.

§ 75.1400-4 Daily examinations of hoisting equipment; records.

Records of the daily examinations of hoisting equipment required by § 75.1400 shall be kept listing all items examined. Daily entries shall be signed by the person or persons making examinations. The reports of the examinations shall be read and countersigned by a responsible company official daily.

OMB CONTROL NO. 1219-0034. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.1401 Hoists; rated capacities; ropes; indicators.

[STATUTORY PROVISIONS]

Hoists shall have rated capacities consistent with the loads handled and the recommended safety factors of the ropes used. An accurate and reliable indicator of the position of the cage, platform, skip, bucket, or cars shall be provided.

§ 75.1401-1 Hoists, standards for ropes.

The American National Standards Institute "Specifications For the Use of Wire Ropes For Mines," M11.1-1960, or the latest revision thereof, shall be used as a guide in the use, selection, installation, and maintenance of wire ropes used for hoisting.

§ 75.1401-2 Hoists; notification of changes affecting rated capacity.

Alterations or changes in a hoist which affect the rated capacity shall be made only with the approval of the Coal Mine Safety District or Subdistrict Manager.

§ 75.1401-3 Hoists; indicators.

The indicator required by § 17.1401 of this chapter shall be placed so that it is in clear view of the hoisting engineer and shall be checked daily to determine its accuracy.

§ 75.1402 Communication between shaft stations and hoist room.

[STATUTORY PROVISIONS]

There shall be at least two effective methods approved by the Secretary of signaling between each of the shaft stations and the hoist room, one of which shall be a telephone or speaking tube.

§ 75.1402-1 Communication between shaft stations and hoist room.

One of the methods used to communicate between shaft stations and the hoist room shall give signals which can be heard by the hoisting engineer at all times while men are underground.

§ 75.1402-2 Tests of signaling systems.

Signaling systems used for communication between shaft stations and the hoist room shall be tested daily.

§ 75.1403 Other safeguards.

[STATUTORY PROVISIONS]

Other safeguards adequate, in the judgment of an authorized representative of the Secretary, to minimize hazards with respect to transportation of men and materials shall be provided.

§ 75.1403-1 General criteria.

(a) Sections 75.1403-2 through 75.1403-11 set out the criteria by which an authorized representative of the Secretary will be guided in requiring other safeguards on a mine-by-mine basis under § 75.1403. Other safeguards may be required.

(b) The authorized representative of the Secretary shall in writing advise the operator of a specific safeguard which is required pursuant to § 75.1403 and shall fix a time in which the operator shall provide and thereafter maintain such safeguard. If the safeguard is not provided within the time fixed and if it is not maintained thereafter, a notice shall be issued to the operator pursuant to section 104 of the Act.

(c) Nothing in the sections in the § 75.1403 series in this Subpart O precludes the issuance of a withdrawal order because of imminent danger.

§ 75.1403-2 Criteria—Hoists transporting materials; brakes.

Hoists and elevators used to transport materials should be equipped with brakes capable of stopping and holding the fully loaded platform, cage, skip, car, or other device at any point in the shaft, slope, or incline.

§ 75.1403-3 Criteria—Drum clutch; attachment of ropes; cage construction.

(a) The clutch of free-drums on man-hoist should be provided with a locking mechanism or interlocked with the brake to prevent the accidental withdrawal of the clutch.

(b) The hoist rope attached to a cage, man car, or trip should be equipped with two bridle chains or cables connected securely to the rope at least 3 feet above the attaching device and to the crosspiece of the cage, man car or trip.

(c) The hoist rope should have at least three full turns on the drum when extended to its maximum working length and should make at least one full turn on the drum shaft or around the spoke of the drum in the case of a free drum, and be fastened securely.

(d) Cages used for hoisting men should be constructed with the sides enclosed to a height of at least 6 feet and should have gates, safety chains, or bars across the ends of the cage when men are being hoisted or lowered.

(e) Self-dumping cages, platforms, or other devices used for transportation of men should have a locking device to prevent tilting when men are transported thereon.

(f) An attendant should be on duty at the surface when men are being hoisted or lowered at the beginning and end of each operating shift.

(g) Precautions should be taken to protect persons working in shaft sumps.

(h) Workmen should wear safety belts while doing work in or over shafts.

§ 75.1403-4 Criteria—Automatic elevators.

(a) The doors of automatic elevators should be equipped with interlocking switches so arranged that the elevator car will be immovable while any door is opened or unlocked, and arranged so that such door or doors cannot be inadvertently opened when the elevator car is not at a landing.

(b) A "Stop" switch should be provided in the automatic elevator compartment that will permit the elevator to be stopped at any location in the shaft.

(c) A slack cable device should be used where appropriate on automatic elevators which will automatically shut-off the power and apply the brakes in the event the elevator is obstructed while descending.

(d) Each automatic elevator should be provided with a telephone or other effective communication system by which aid or assistance can be obtained promptly.

§ 75.1403-5 Criteria—Belt conveyors.

(a) Positive-acting stop controls should be installed along all belt conveyors used to transport men, and such controls should be readily accessible and maintained so that the belt can be stopped or started at any location.

(b) Belt conveyors used for regularly scheduled mantrips should be stopped while men are loading or unloading.

(c) All belt conveyors used for the transportation of persons should have a minimum vertical clearance of 18 inches from the nearest overhead projection when measured from the edge of the belt and there should be at least 36 inches of side clearance where men board or leave such belt conveyors.

(d) When men are being transported on regularly scheduled mantrips on belt conveyors the belt speed should not exceed 300 feet per minute when the vertical clearance is less than 24 inches, and should not exceed 350 feet per minute when the vertical clearance is 24 inches or more.

(e) Adequate illumination including colored lights or reflective signs should be installed at all loading and unloading stations. Such colored lights and reflective signs should be so located as to be observable to all persons riding the belt conveyor.

(f) After supplies have been transported on belt conveyors such belts should be examined for unsafe conditions prior to the transportation of men on regularly scheduled mantrips, and belt conveyors should be clear before men are transported.

(g) A clear travelway at least 24 inches wide should be provided on both sides of all belt conveyors installed after March 30, 1970. Where roof supports are installed within 24 inches of a belt conveyor, a clear travelway at least 24 inches wide should be provided on the side of such support farthest from the conveyor.

(h) On belt conveyors that do not transport men, stop and start controls should be installed at intervals not to exceed 1,000 feet. Such controls should be properly installed and positioned so as to be readily accessible.

(i) Telephone or other suitable communications should be provided at points where men or supplies are regularly loaded on or unloaded from the belt conveyors.

(j) Persons should not cross moving belt conveyors, except where suitable crossing facilities are provided.

§ 75.1403-6 Criteria—Self-propelled personnel carriers.

(a) Each self-propelled personnel carrier should:

(1) Be provided with an audible warning device;

(2) Be provided with a sealed-beam headlight, or its equivalent, on each end;

(3) Be provided with reflectors on both ends and sides.

(b) In addition, each track-mounted self-propelled personnel carrier should:

(1) Be provided with a suitable lifting jack and bar, which shall be secured or carried in a tool compartment;

(2) Be equipped with 2 separate and independent braking systems properly installed and well maintained;

(3) Be equipped with properly installed and well-maintained sanding devices, except that personnel carriers (jitneys), which transport not more than 5 men, need not be equipped with such sanding device;

(4) If an open type, be equipped with guards of sufficient strength and height to prevent personnel from being thrown from such carriers.

§ 75.1403-7 Criteria—Mantrips.

(a) Mantrips should be operated independently of any loaded trip, empty trip, or supply trip and should not be operated within 300 feet of any trip, including another mantrip.

(b) A sufficient number of mantrip cars should be provided to prevent overcrowding of men.

(c) Mantrips should not be pushed.

(d) Where mantrips are operated by locomotives on slopes such mantrips should be coupled to the front and rear by locomotives capable of holding such mantrips. Where ropes are used on slopes for mantrip haulage, such conveyances should be connected by chains, steel ropes, or other effective devices between mantrip cars and the rope.

(e) Safety goggles or eyeshields should be provided for all persons being transported in open-type mantrips.

(f) All trips, including trailers and sleds, should be operated at speeds consistent with conditions and the equipment used, and should be so controlled that they can be stopped within the limits of visibility.

(g) All mantrips should be under the direction of a supervisor and the operator of each mantrip should be familiar with the haulage safety rules and regulations.

(h) Men should proceed in an orderly manner to and from mantrips and no person should be permitted to get on or off a moving mantrip.

(i) Explosives and detonators should not be permitted on any mantrip or hauled within 5 minutes before or after any mantrip.

(j) Mantrips should not be permitted to proceed until the operator of the mantrip is assured that he has a clear road.

(k) Supplies or tools, except small hand tools or instruments, should not be transported with men.

(l) At places where men enter or leave mantrip conveyances, ample clearance should be provided and provisions made to prevent persons from coming in contact with energized electric circuits.

(m) The mine car next to a trolley locomotive should not be used to transport men. Such cars may be used to transport small tools and supplies. This is not to be construed as permitting the transportation of large or bulky supplies such as shuttle car wheel units, or similar material.

(n) Drop-bottom cars used to transport men should have the bottoms secured with an additional locking device.

(o) Extraneous materials or supplies should not be transported on top of equipment; however, materials and supplies that are necessary for or related to the operation of such equipment may be transported on top of such equipment if a hazard is not introduced.

§ 75.1403-8 Criteria—Track haulage roads.

(a) The speed at which haulage equipment is operated should be determined by the condition of the roadbed, rails, rail joints, switches, frogs, and other elements of the track and the type and condition of the haulage equipment.

(b) Track haulage roads should have a continuous clearance on one side of at least 24 inches from the farthest projection of normal traffic. Where it is necessary to change the side on which clearance is provided, 24 inches of clearance should be provided on both sides for a distance of not less than 100 feet and warning signs should be posted at such locations.

(c) Track haulage roads developed after March 30, 1970, should have clearance on the "tight" side of at least 12 inches from the farthest projection of normal traffic. A minimum clearance of 6 inches should be maintained on the "tight" side of all track haulage roads developed prior to March 30, 1970.

(d) The clearance space on all track haulage roads should be kept free of loose rock, supplies, and other loose materials.

(e) Positive stopblocks or derails should be installed on all tracks near the top and at landings of shafts, slopes, and surface inclines.

§ 75.1403-9 Criteria—Shelter holes.

(a) Shelter holes should be provided on track haulage roads at intervals of not more than 105 feet unless otherwise approved by the Coal Mine Safety District Manager(s).

(b) Shelter holes should be readily accessible and should be at least 5 feet in depth, not more than 4 feet in width (except crosscuts used as shelter holes) and at least the height of the coal seam where the coal seam is less than 6 feet high and at least 6 feet in height where the coal seam is 6 feet or more in height.

(c) Shelter holes should be kept free of refuse and other obstructions. Crosscuts used as shelter holes should be kept free of refuse or other materials to a depth of at least 15 feet.

(d) Shelter holes should be provided at all manually operated doors and at switch throws except: (1) At room switches, or (2) at switches where more than 6 feet of side clearance is provided. The Coal Mine Safety District Manager(s) may permit exemption of this requirement if such shelter holes create a hazardous roof condition.

(e) At each underground slope landing where men pass and cars are handled, a shelter hole at least 10 feet in depth, 4 feet in width, and 6 feet in height should be provided.

§ 75.1403-10 Criteria—Haulage; general.

(a) A permissible trip light or other approved device such as reflectors, approved by the Coal Mine Safety District Manager(s), should be used on the rear of trips pulled, on the front of trips pushed and on trips lowered in slopes. However, trip lights or other approved devices need not be used on cars being shifted to and from loading machines, on cars being handled at loading heads, during gathering operations at working faces, when trailing locomotives are used, or on trips pulled by animals.

(b) Cars on main haulage roads should not be pushed, except where necessary to push cars from side tracks located near the working section to the producing entries and rooms, where necessary to clear switches and sidetracks, and on the approach to cages, slopes, and surface inclines.

(c) Warning lights or reflective signs or tapes should be installed along haulage roads at locations of abrupt or sudden changes in the overhead clearance.

(d) No person, other than the motorman and brakeman, should ride on a locomotive unless authorized by the mine foreman, and then only when safe riding facilities are provided. No person should ride on any loaded car or on the bumper of any car. However, the brakeman may ride on the rear bumper of the last car of a slow moving trip pulled by a locomotive.

(e) Positive-acting stopblocks or derails should be used where necessary to protect persons from danger of runaway haulage equipment.

(f) An audible warning should be given by the operator of all self-propelled equipment including off-track equipment, where persons may be endangered by the movement of the equipment.

(g) Locomotives and personnel carriers should not approach to within 300 feet of preceding haulage equipment, except trailing locomotives that are an integral part of the trip.

(h) A total of at least 36 inches of unobstructed side clearance (both sides combined) should be provided for all rubber-tired haulage equipment where such equipment is used.

(i) Off-track haulage roadways should be maintained as free as practicable from bottom irregularities, debris, and wet or muddy conditions that affect the control of the equipment.

(j) Operators of self-propelled equipment should face in the direction of travel.

(k) Mechanical steering and control devices should be maintained so as to provide positive control at all times.

(l) All self-propelled rubber-tired haulage equipment should be equipped with well maintained brakes, lights, and a warning device.

(m) On and after March 30, 1971, all tram control switches on rubber-tired equipment should be designed to provide automatic return to the stop or off position when released.

§ 75.1403-11 Criteria—Entrances to shafts and slopes.

All open entrances to shafts should be equipped with safety gates at the top and at each landing. Such gates should be self-closing and should be kept closed except when the cage is at such landing.

§ 75.1404 Automatic brakes; speed reduction gear.

[STATUTORY PROVISIONS]

Each locomotive and haulage car used in an underground coal mine shall be equipped with automatic brakes, where space permits. Where space does not permit automatic

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brakes, locomotives and haulage cars shall be subject to speed reduction gear, or other similar devices approved by the Secretary, which are designed to stop the locomotives and haulage cars with the proper margin of safety.

§ 75.1404-1 Braking system.

A locomotive equipped with a dual braking system will be deemed to satisfy the requirements of § 75.1404 for a train comprised of such locomotive and haulage cars, provided the locomotive is operated within the limits of its design capabilities and at speeds consistent with the condition of the haulage road. A trailing locomotive or equivalent devices should be used on trains that are operated on ascending grades.

§ 75.1405 Automatic couplers.

[STATUTORY PROVISIONS]

All haulage equipment acquired by an operator of a coal mine on or after March 30, 1971, shall be equipped with automatic couplers which couple by impact and uncouple without the necessity of persons going between the ends of such equipment. All haulage equipment without automatic couplers in use in a mine on March 30, 1970, shall also be so equipped within 4 years after March 30, 1970.

§ 75.1405-1 Automatic couplers, haulage equipment.

The requirement of § 75.1405 with respect to automatic couplers applies only to track haulage cars which are regularly coupled and uncoupled.

Subpart P—Emergency Shelters

§ 75.1500 Emergency shelters.

[STATUTORY PROVISIONS]

The Secretary or an authorized representative of the Secretary may prescribe in any coal mine that rescue chambers, properly sealed and ventilated, be erected at suitable locations in the mine to which persons may go in case of an emergency for protection against hazards. Such chambers shall be properly equipped with first aid materials, an adequate supply of air and self-contained breathing equipment, an independent communication system to the surface, and proper accommodations for the persons while awaiting rescue, and such other equipment as the Secretary may require. A plan for the erection, maintenance, and revisions of such chambers and the training of the miners in their proper use shall be submitted by the operator to the Secretary for his approval.

Subpart Q—Communications

§ 75.1600 Communications.

[STATUTORY PROVISIONS]

Telephone service or equivalent two-way communication facilities, approved by the Secretary or his authorized representative, shall be provided between the surface and each landing of main shafts and slopes and between the surface and each working section of any coal mine that is more than 100 feet from a portal.

§ 75.1600-1 Communication facilities; main portals; installation requirements.

A telephone or equivalent two-way communication facility shall be located on the surface within 500 feet of all main portals, and shall be installed either in a building or in a box-like structure designed to protect the facilities from damage by inclement weather. At least one of these communication facilities shall be at a location where a responsible person who is always on duty when men are underground can hear the facility and respond immediately in the event of an emergency.

[38 FR 29999, Oct. 31, 1973]

§ 75.1600-2 Communication facilities; working sections; installation and maintenance requirements; audible or visual alarms.

(a) Telephones or equivalent two-way communication facilities provided at each working section shall be located not more than 500 feet outby the last open crosscut and not more than 800 feet from the farthest point of penetration of the working places on such section.

(b) The incoming communication signal shall activate an audible alarm, distinguishable from the surrounding noise level, or a visual alarm that can be seen by a miner regularly employed on the working section.

(c) If a communication system other than telephones is used and its operation depends entirely upon power from the mine electric system, means shall be provided to permit continued communication in the event the mine electric power fails or is cut off; provided, however, that where trolley phones and telephones are both used, an alternate source of power for the trolley phone system is not required.

(d) Trolley phones connected to the trolley wire shall be grounded in accordance with Subpart H of this part.

(e) Telephones or equivalent two-way communication facilities shall be maintained in good operating condition at all times. In the event of any failure in the system that results in loss of communication, repairs shall be started immediately, and the system restored to operating condition as soon as possible.

[38 FR 29999, Oct. 31, 1973]

Subpart R—Miscellaneous

§ 75.1700 Oil and gas wells.

[STATUTORY PROVISIONS]

Each operator of a coal mine shall take reasonable measures to locate oil and gas wells penetrating coalbeds or any underground area of a coal mine. When located, such operator shall establish and maintain barriers around such oil and gas wells in accordance with State laws and regulations, except that such barriers shall not be less than 300 feet in diameter, unless the Secretary or his authorized representative permits a lesser barrier consistent with the applicable State laws and regulations where such lesser barrier will be adequate to protect against hazards from such wells to the miners in such mine, or unless the Secretary or his authorized representative requires a greater barrier where the depth of the mine, other geologic conditions, or other factors warrant such a greater barrier.

§ 75.1701 Abandoned areas, adjacent mines; drilling of boreholes.

[STATUTORY PROVISIONS]

Whenever any working place approaches within 50 feet of abandoned areas in the mine as shown by surveys made and certified by a registered engineer or surveyor, or within 200 feet of any other abandoned areas of the mine which cannot be inspected and which may contain dangerous accumulations of water or gas, or within 200 feet of any workings of an adjacent mine, a borehole or boreholes shall be drilled to a distance of at least 20 feet in advance of the working face of such working place and shall be continually maintained to a distance of at least 10 feet in advance of the advancing working face. When there is more than one borehole, they shall be drilled sufficiently close to each other to insure that the advancing working face will not accidentally hole through into abandoned areas or adjacent mines. Boreholes shall also be drilled not more than 8 feet apart in the rib of such working place to a distance of at least 20 feet and at an angle of 45 degrees. Such rib holes shall be drilled in one or both ribs of such working place as may be necessary for adequate protection of miners in such place.

§ 75.1702 Smoking; prohibition.

[STATUTORY PROVISIONS]

No person shall smoke, carry smoking materials, matches, or lighters underground, or smoke in or around oil houses, explosives magazines, or other surface areas where such practice may cause a fire or explosion. The operator shall institute a program, approved by the Secretary, to insure that any person entering the underground area of the mine does not carry smoking materials, matches, or lighters.

OMB CONTROL No. 1219-0041. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982]

§ 75.1702-1 Smoking programs.

Programs required under § 75.1702 shall be submitted to the Coal Mine Safety District Manager for approval on or before May 30, 1970.

§ 75.1703 Portable electric lamps.

[Statutory Provisions]

Persons underground shall use only permissible electric lamps approved by the Secretary for portable illumination. No open flame shall be permitted in the underground area of any coal mine, except as permitted under § 75.1106.

§ 75.1703-1 Permissible lamps.

Lamps approved by the Bureau of Mines or the Mine Safety and Health Administration under Part 19 or Part 20 of this chapter (Bureau of Mines Schedule 6D and Schedule 10C) are approved lamps for the purposes of § 75.1703.

§ 75.1704 Escapeways.

[Statutory Provisions]

Except as provided in §§ 75.1705 and 75.1706, at least two separate and distinct travelable passageways which are maintained to insure passage at all times of any person, including disabled persons, and which are to be designated as escapeways, at least one of which is ventilated with intake air, shall be provided from each working section continuous to the surface escape drift opening, or continuous to the escape shaft or slope facilities to the surface, as appropriate, and shall be maintained in safe condition and properly marked. Mine openings shall be adequately protected to prevent the entrance into the underground area of the mine of surface fires, fumes, smoke, and floodwater. Escape facilities approved by the Secretary or his authorized representative, properly maintained and frequently tested, shall be present at or in each escape shaft or slope to allow all persons, including disabled persons, to escape quickly to the surface in the event of an emergency.

§ 75.1704-1 Escapeways and escape facilities.

This section sets out criteria by which District Managers will be guided in approving escapeways and escape facilities. Escapeways and escape facilities that do not meet these criteria may be approved providing the operator can satisfy the District Manager that such escapeways and facilities will enable miners to escape quickly to the surface in the event of an emergency.

(a) Except in situations where the height of the coalbed is less than 5 feet, escapeways should be maintained at a height of at least 5 feet (excluding necessary roof support) and the travelway in such escapeway should be maintained at a width of at least 6 feet. In those situations where the height of the coalbed is less than 5 feet the escapeway should be maintained to the height of the coalbed (excluding any necessary roof support) and the travelway in such escapeways should be maintained at a width of at least 6 feet.

(b) Each escape shaft which is more than 20 feet deep shall include elevators, hoists, cranes, or other such equipment, which shall be equipped with cages and buckets. When such facilities are not automatically operated, an attendant shall be on duty during any coal-producing or maintenance shift. An "attendant" as used in this subsection means a person located on the surface in a position where it is possible to hear or see a signal calling for the use of such facilities and who is readily available to operate such facilities or to readily obtain another person to operate such facilities.

(c) Stairways shall be installed in all escape shafts which are 20 feet or less in depth; however, in shafts 5 feet or less in depth, ladders may be substituted for stairways. Stairways and ladders shall be installed and maintained as follows:

(1) Stairways shall be of substantial construction, set on an angle not greater than 45 degrees with the horizontal and equipped on the open side with suitable handrails. Where landing platforms are necessary, they shall

be at least 2 feet wide and 4 feet long and properly railed.

(2) Ladders shall be anchored securely, set on an angle of not more than 60 degrees and be substantially constructed and maintained in good condition.

§ 75.1704-2 Escapeway routes; examination; escapeway maps; drills.

(a) In mines and working sections opened on and after January 1, 1974, all travelable passageways designated as escapeways in accordance with § 75.1704 shall be located to follow, as determined by an authorized representative of the Secretary, the safest direct practical route to the nearest mine opening suitable for the safe evacuation of miners. Escapeways from working sections may be located through existing entries, rooms, or crosscuts.

(b) In mines and working sections in existence prior to January 1, 1974, all travelable passageways designated as escapeways in accordance with § 75.1704 shall, no later than June 30, 1974, be located to follow, as determined by an authorized representative of the Secretary, the safest, direct practical route to the nearest mine opening suitable for the safe evacuation of miners. Escapeways from working sections may be located through existing entries, rooms and crosscuts.

(c)(1) All escapeways shall be examined in their entirety at least once each week by a certified person. Such weekly examination need not be made during any week in which the mine is idle for the entire week, except that such examination shall be made before any miner other than the certified person returns to the mine. The phrase "once each week" shall mean at intervals not exceeding seven days.

(2) The certified person making such examination shall place his initials, the date, and time at various locations along the passageways and, if any hazardous conditions are found, such conditions shall be reported promptly to the operator. The results of the examinations shall be recorded in the book specified in § 75.1801 relating to the examination of emergency escapeways. Any hazardous conditions observed shall be corrected immediately.

(d) A map of the mine, showing the main escape system, shall be posted at a location where all miners can acquaint themselves with the main escape system. A map showing the designated escapeways from the working section to the main escape system, shall be posted in each working section, in order that the miners in the section can acquaint themselves with the designated escapeways from the section to the main escape system. All maps shall be kept up to date, and any changes in routes of travel, location of doors, or direction of air-flow shall be promptly shown on the maps when the changes are made and shall be promptly brought to the attention of all miners.

(e) Practice escapeway drills shall be conducted so that all miners are kept informed of the route of escape, any necessary ventilation changes, the location of fire doors, check curtains, or smoke-retarding doors, and plans for diverting smoke from escapeways. Such practice drills shall ensure that each miner travels the escapeways through his respective working section up to the main escapeways at least once every 90 days, and that at least two miners, including the supervisor, on each producing section travel through the main escapeways up to the portal at least once every six weeks.

(f) The practice escapeway drills may be utilized to satisfy the evacuation specifications of the fire drills required by § 75.1101-23.

OMB CONTROL No. 1219-0052. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[38 FR 30000, Oct. 31, 1973, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.1705 Opening new mines.

[STATUTORY PROVISIONS]

When new coal mines are opened, not more than 20 miners shall be allowed at any one time in any mine until a connection has been made between the two mine openings, and such connections shall be made as soon as possible.

§ 75.1706 Final mining of pillars.

[STATUTORY PROVISIONS]

When only one mine opening is available, owing to final mining of pillars, not more than 20 miners shall be allowed in such mine at any one time, and the distance between the mine opening and working face shall not exceed 500 feet.

§ 75.1707 Escapeways; intake air; separation from belt and trolley haulage entries.

[STATUTORY PROVISIONS]

In the case of all coal mines opened on or after March 30, 1970, and in the case of all new working sections opened on or after such date in mines opened prior to such date, the escapeway required by this section to be ventilated with intake air shall be separated from the belt and trolley haulage entries of the mine for the entire length of such entries to the beginning of each working section, except that the Secretary or his authorized representative may permit such separation to be extended for a greater or lesser distance so long as such extension does not pose a hazard to the miners.

§ 75.1707-1 New working section.

The term "new working section" as used in § 75.1707 means any extension of the belt or trolley haulage system in main, cross, and room entries necessary for the development of the mine on and after March 30, 1970. Room entries being developed as of March 30, 1970, with certified stop line limitations as shown on the mine map and retreating panels shall not be considered as new working sections.

§ 75.1708 Surface structures, fireproofing.

[STATUTORY PROVISIONS]

After March 30, 1970, all structures erected on the surface within 100 feet of any mine opening shall be of fireproof construction. Unless structures existing on or prior to such date which are located within 100 feet of any mine opening are of such construction, fire doors shall be erected at effective points in mine openings to prevent smoke or fire from outside sources endangering miners underground. These doors shall be tested at least monthly to insure effective operation. A record of such tests shall be kept in an area on the surface of the mine chosen by the operator to minimize the danger of destruction by fire or other hazard and shall be available for inspection by interested persons.

§ 75.1708-1 Surface structures; fireproof construction.

Structures of fireproof construction is interpreted to mean structures with fireproof exterior surfaces.

§ 75.1709 Accumulations of methane and coal dust on surface coal-handling facilities.

[STATUTORY PROVISIONS]

Adequate measures shall be taken to prevent methane and coal dust from accumulating in excessive concentrations in or on surface coal-handling facilities, but in no event shall methane be permitted to accumulate in concentrations in or on surface coal-handling facilities in excess of limits established for methane by the Secretary on and after March 30, 1971. Where coal is dumped at or near air-intake openings, provisions shall be made to avoid dust from entering the mine.

§ 75.1710 Canopies or cabs; electric face equipment.

[STATUTORY PROVISIONS]

An authorized representative of the Secretary may require in any coal mine where the height of the coalbed permits that electric face equipment, including shuttle cars, be provided with substantially constructed canopies, or cabs, to protect the miners operating such equipment from roof falls and from rib and face rolls.

§ 75.1710-1 Canopies or cabs; self-propelled electric face equipment; installation requirements.

(a) Except as provided in paragraph (f) of this section, all self-propelled electric face equipment, including shuttle cars, which is employed in the active workings of each underground coal mine on and after January 1, 1973, shall, in accordance with the schedule of time specified in paragraphs (a) (1), (2), (3), (4), (5), and (6) of this section, be equipped with substantially constructed canopies or cabs, located and installed in such a manner that when the operator is at the operating controls of such equipment he shall be protected from falls of roof, face, or rib, or from rib and face rolls. The requirements of this paragraph (a) shall be met as follows:

(1) On and after January 1, 1974, in coal mines having mining heights of 72 inches or more;

(2) On and after July 1, 1974, in coal mines having mining heights of 60 inches or more, but less than 72 inches;

(3) On and after January 1, 1975, in coal mines having mining heights of 48 inches or more, but less than 60 inches;

(4) On and after July 1, 1975, in coal mines having mining heights of 36 inches or more, but less than 48 inches;

(5)(i) On and after January 1, 1976, in coal mines having mining heights of 30 inches or more, but less than 36 inches,

(ii) On and after July 1, 1977, in coal mines having mining heights of 24 inches or more, but less than 30 inches, and

(6) On and after July 1, 1978, in coal mines having mining heights of less than 24 inches.

(b)(1) For purposes of this section, a canopy means a structure which provides overhead protection against falls of roof.

(2) For purposes of this section, a cab means a structure which provides overhead and lateral protection against falls of roof, rib, and face, or rib and face rolls.

(c) In determining whether to install substantially constructed canopies as opposed to substantially constructed cabs, the operator shall consider and take into account the following factors:

(1) The mining method used;

(2) Physical limitations, including but not limited to the dip of the coalbed, and roof, rib, and face conditions;

(3) Previous accident experience, if any, caused by falls of roof, rib, and face, or rib and face rolls;

(4) Overhead protection, such as that afforded by a substantially constructed canopy, against falls of roof will always be required; and

(5) Lateral protection, such as that afforded by a substantially constructed cab, may also be necessary where the occurrence of falls of rib and face, or rib and face rolls is likely.

(d) For purposes of this section, a canopy or cab will be considered to be substantially constructed if a registered engineer certifies that such canopy or cab has the minimum structural capacity to support elastically: (1) A dead weight load of 18,000 pounds, or (2) 15 p.s.i. distributed uniformly over the plan view area of the structure, whichever is lesser.

(e) Evidence of the certification required by paragraph (d) of this section shall be furnished by attaching a plate, label, or other appropriate marking to the canopy or cab for which certification has been made, stating that such canopy or cab meets the minimum requirements for structural capacity set forth in paragraph (d) of this section. Written evidence of such certification shall also be retained by the operator, and shall be made available to an authorized representative of the Secretary upon request. Written evidence of certification may consist of the report of the registered engineer who certified the canopy or cab, or of information from the manufacturer of the canopy or cab stating that a registered engineer has certified that the canopy or cab meets the minimum requirements for structural capacity set forth in paragraph (d) of this section.

(f) An operator may apply to the Director of Technical Support, Mine Safety and Health Administration, Department of Labor, 4015 Wilson Boulevard, Arlington, Va. 22203, for approval of the installation of devices to be used in lieu of substantially constructed canopies or cabs on self-propelled electric face equipment. The Director of Technical Support may approve such devices if he determines that the use thereof will afford the equipment operator no less than the same measure of protection from falls of roof, face, or rib, or from rib and face rolls as would a substantially constructed canopy or cab meeting the requirements of this section.

[37 FR 20690, Oct. 3, 1972, as amended by 41 FR 23200, June 9, 1976; 43 FR 12320, Mar. 24, 1978; 47 FR 28096, June 29, 1982]

EFFECTIVE DATE NOTE: At 42 FR 34877, July 7, 1977, the dates appearing in paragraphs (a)(5)(ii) and (a)(6) of § 75.1710-1 were suspended indefinitely, effective July 1, 1977.

§ 75.1711 Sealing of mines.

[STATUTORY PROVISIONS]

On or after March 30, 1970, the opening of any coal mine that is declared inactive by the operator, or is permanently closed, or abandoned for more than 90 days, shall be sealed by the operator in a manner prescribed by the Secretary. Openings of all other mines shall be adequately protected in a manner prescribed by the Secretary to prevent entrance by unauthorized persons.

§ 75.1711-1 Sealing of shaft openings.

Shaft openings required to be sealed under § 75.1711 shall be effectively capped or filled. Filling shall be for the entire depth of the shaft and, for the first 50 feet from the bottom of the coalbed, the fill shall consist of incombustible material. Caps consisting of a 6-inch thick concrete cap or other equivalent means may be used for sealing. Caps shall be equipped with a vent pipe at least 2 inches in diameter extending for a distance of at least 15 feet above the surface of the shaft.

§ 75.1711-2 Sealing of slope or drift openings.

Slope or drift openings required to be sealed under § 75.1711 shall be sealed with solid, substantial, incombustible material, such as concrete blocks, bricks or tile, or shall be completely filled with incombustible material for a distance of at least 25 feet into such openings.

§ 75.1711-3 Openings of active mines.

The openings of all mines not declared by the operator, to be inactive, permanently closed, or abandoned for less than 90 days shall be adequately fenced or posted with conspicuous signs prohibiting the entrance of unauthorized persons.

§ 75.1712 Bath houses and toilet facilities.

[STATUTORY PROVISIONS]

The Secretary may require any operator to provide adequate facilities for the miners to change from the clothes worn underground, to provide for the storing of such clothes from shift to shift, and to provide sanitary and bathing facilities. Sanitary toilet facilities shall be provided in the active workings of the mine when such surface facilities are not readily accessible to the active workings.

OMB CONTROL NO. 1219-0018. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982]

§ 75.1712-1 Availability of surface bathing facilities; change rooms; and sanitary facilities.

Except where a waiver has been granted pursuant to the provisions of § 75.1712-4, each operator of an underground coal mine shall on and after December 30, 1970, provide bathing facilities, clothing change rooms, and sanitary facilities, as hereinafter prescribed, for the use of the miners at the mine.

§ 75.1712-2 Location of surface facilities.

Bathhouses, change rooms, and sanitary toilet facilities shall be in a location convenient for the use of the miners. Where such facilities are designed to serve more than one mine, they shall be centrally located so as to be as convenient for the use of the miners in all the mines served by such facilities.

§ 75.1712-3 Minimum requirements of surface bathing facilities, change rooms, and sanitary toilet facilities.

(a) All bathing facilities, change rooms, and sanitary toilet facilities shall be provided with adequate light, heat, and ventilation so as to maintain a comfortable air temperature and to minimize the accumulation of moisture and odors, and such facilities shall be maintained in a clean and sanitary condition.

(b) Bathing facilities, change rooms, and sanitary toilet facilities shall be constructed and equipped so as to comply with applicable State and local building codes: *Provided, however,* That where no State or local building codes apply to such facilities, or where no State or local building codes exist, such facilities shall be constructed and equipped so as to meet the minimum construction requirements of the National Building Code; and the minimum plumbing requirements of the U.S.A. Standard Plumbing Code, ASA A40.8-1955.

(c) In addition to the minimum requirements specified in paragraphs (a) and (b) of this § 75.1712-3, facilities maintained in accordance with § 75.1712-1 shall include the following:

(1) *Bathing facilities.* (i) Showers shall be provided with both hot and cold water.

(ii) At least one shower head shall be provided where five or less miners use such showers.

(iii) Where five or more miners use such showers, sufficient showers shall be furnished to provide approximately one shower head for each five miners.

(iv) A suitable cleansing agent shall be provided for use at each shower.

(2) *Sanitary toilet facilities.* (i) At least one sanitary flush toilet shall be provided where 10 or less miners use such facilities.

(ii) Where 10 or more miners use such sanitary toilet facilities, sufficient toilets shall be furnished to provide approximately one sanitary flush toilet for each 10 miners.

(iii) Where 30 or more miners use sanitary toilet facilities, one urinal may be substituted for one sanitary flush toilet, however, where such substitutions are made they shall not reduce the number of toilets below a ratio of two toilets to one urinal.

(iv) An adequate supply of toilet paper shall be provided with each toilet.

(v) Adequate handwashing facilities or hand lavatories shall be provided in or adjacent to each toilet facility.

(3) *Change rooms.* (i) Individual clothes storage containers or lockers shall be provided for storage of miners clothing and other incidental personal belongings during and between shifts.

(ii) Change rooms shall be provided with ample space to permit the use of such facilities by all miners changing clothes prior to and after each shift.

§ 75.1712-4 Waiver of surface facilities requirements.

The Coal Mine Safety District Manager for the district in which the mine is located may, upon written application by the operator, waive any or all of the requirements of §§ 75.1712-1 through 75.1712-3 if he determines that the operator of the mine cannot or need not meet any part or all of such requirements, and, upon issuance of such waiver, he shall set forth the facilities which will not be required and the specific reason or reasons for such waiver.

OMB Control No. 1219-0024. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982]

§ 75.1712-5 Application for waiver of surface facilities.

Applications for waivers of the requirements of §§ 75.1712-1 through 75.1712-3 shall be filed with the Coal Mine Safety District Manager and shall contain the following information:

(a) The name and address of the mine operator;

(b) The name and location of the mine;

(c) A statement explaining why, in the opinion of the operator, the installation or maintenance of the facilities is impractical or unnecessary.

§ 75.1712-6 Underground sanitary facilities; approved sanitary toilets; installation and maintenance.

(a) Except as provided in § 75.1712-7, each operator of an underground coal mine shall, on and after December 30, 1970, provide and maintain one approved sanitary toilet, together with an adequate supply of toilet tissue, in a dry location under protected roof, within 500 feet of each working place in the mine where miners are regularly employed during the mining cycle. A single approved sanitary toilet may serve two or more working places in the same mine, if it is located within 500 feet of each such working place.

(b) Only sanitary toilets approved by the Health Division, Coal Mine Health and Safety, Mine Safety and Health Administration shall meet the requirements of this section.

(c) Applications for approval of sanitary toilets shall be submitted to:

Health Division, Coal Mine Health and Safety, Mine Safety and Health Administration, Department of Labor, 4015 Wilson Boulevard, Arlington, Va. 22203.

[35 FR 17890, Nov. 20, 1970, as amended at 43 FR 12320, Mar. 24, 1978]

§ 75.1712-7 Underground sanitary facilities; waiver of requirements.

If it has been determined by the Coal Mine Safety District Manager for the district in which the mine is located that sanitary toilets cannot be provided and maintained within 500 feet of a working place because of the thickness of the coal seam or because of any other physical restriction in the underground workings, he may, upon written application by the operator, waive the location requirements for underground sanitary facilities with respect to such working place.

§ 75.1712-8 Application for waiver of location requirements for underground sanitary facilities.

Applications for waivers of the location requirements of § 75.1712-6 shall be filed with the Coal Mine Safety District Manager and shall contain the following information:

(a) The name and address of the mine operator;

(b) The name and location of the mine;

(c) The thickness of the coal seam in each working place in the mine for which a waiver is requested; and

(d) Other physical restrictions in the mine (for example, poor roof conditions, excessive water, timbering, etc.).

If a sanitary toilet cannot be installed within 500 feet of a working place because of physical conditions other than the thickness of the coal seam, the operator shall also include a short statement specifying areas in the mine which could be considered possible alternative sites for installation of such facilities.

§ 75.1712-9 Issuance of waivers.

Following the receipt of an application submitted in accordance with the provisions of § 75.1712-8, the Coal Mine Safety District Manager shall, if he determines that the operator cannot meet the location requirements of § 75.1712-6 with respect to any or all of the working places in the mine because of the coal seam thickness or because of other physical restriction, issue a waiver of the requirements of this section and designate an alternative site for installation of such facilities. The waiver issued shall specify each working place to which it shall apply, set forth the reasons for such waiver, and the reasons for designation of the alternative site.

§ 75.1712-10 Underground sanitary facilities; maintenance.

Sanitary toilets shall be regularly maintained in a clean and sanitary condition. Holding tanks shall be serviced and cleaned when full and in no case less than once each week by draining or pumping or by removing them to the surface for cleaning or recharging. Transfer tanks and transfer equipment used underground shall be equipped with suitable fittings to permit complete drainage of holding tanks without spillage and allow for the sanitary transportation of wastes to the surface. Waste shall be disposed of on the surface in accordance with State and local laws and regulations.

§ 75.1713 Emergency medical assistance; first-aid.

[STATUTORY PROVISIONS]

Each operator shall make arrangements in advance for obtaining emergency medical assistance and transportation for injured persons. Emergency communications shall be provided to the nearest point of assistance. Selected agents of the operator shall be trained in first-aid and first-aid training shall be made available to all miners. Each coal mine shall have an adequate supply of first-aid equipment located on the surface, at the bottom of shafts and slopes, and at other strategic locations near the working faces. In fulfilling each of the requirements of this section, the operator shall meet at least minimum requirements prescribed by the Secretary of Health and Human Services.

OMB CONTROL NO. 1219-0036. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982; 47 FR 28096, June 29, 1982]

§ 75.1713-1 Arrangements for emergency medical assistance and transportation for injured persons; agreements; reporting requirements; posting requirements.

(a) Each operator of an underground coal mine shall make arrangements with a licensed physician, medical service, medical clinic, or hospital to provide 24-hour emergency medical assistance for any person injured at the mine.

(b) Each operator of an underground coal mine shall make arrangements with an ambulance service, or otherwise provide, for 24-hour emergency transportation for any person injured at the mine.

(c) Each operator shall, on or before December 30, 1970, report to the District Manager for the district in which the mine is located the name, title and address of the physician, medical service, medical clinic, hospital or ambulance service with whom arrangements have been made, or otherwise provided, in accordance with the provisions of paragraphs (a) and (b) of this § 75.1713-1.

(d) Each operator shall, within 10 days after any change of the arrangements required to be reported under the provisions of this § 75.1713-1, report such changes to the District Manager. If such changes involve a substitution of persons, the operator shall provide the name, title, and address of the person substituted together with the name and address of the medical service, medical clinic, hospital, or ambulance service with which such person or persons are associated.

(e) Each operator shall, immediately after making an arrangement required under the provisions of paragraphs (a) and (b) of this § 75.1713-1, or immediately after any change of such arrangement, post at appropriate places at the mine the names, titles, addresses, and telephone numbers of all persons or services currently available under such arrangements to provide medical assistance and transportation at the mine.

§ 75.1713-2 Emergency communications; requirements.

(a) Each operator of an underground coal mine shall establish and maintain a communication system from the mine to the nearest point of medical assistance for use in an emergency.

(b) The emergency communication system required to be maintained under paragraph (a) of this § 75.1713-2 may be established by telephone or radio transmission or by any other means of prompt communication to any facility (for example, the local sheriff, the State highway patrol, or local hospital) which has available the means of communication with the person or persons providing emergency medical assistance or transportation in accordance with the provisions of § 75.1713-1.

§ 75.1713-3 First-aid training; supervisory employees.

On or before December 30, 1970, each operator of an underground coal mine shall conduct first-aid training courses for selected supervisory employees at the mine, and report in writing to the District Manager the names and job titles of all supervisory employees so trained Thereafter, each operator shall, within 60 days after the selection of a new supervisory employee to be trained, report in writing to the District Manager the name and job title of such employee and the date on which such employee satisfactorily completed a first-aid training course.

OMB CONTROL NO. 1219-0038. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17928, Nov. 20, 1970, as amended at 44 FR 9380, Feb. 13, 1979; 47 FR 14696, Apr. 6, 1982; 47 FR 23641, May 28, 1982]

§ 75.1713-4 First-aid training program; availability of instruction to all miners.

On or before June 30, 1971, each operator of an underground coal mine shall make available to all miners employed in the mine a course of instruction in first-aid conducted by the operator or under the auspices of the operator, and such a course of instruction shall be made available to newly employed miners within 6 months after the date of employment.

§ 75.1713-5 First-aid training program; retraining of supervisory employees; availability to all miners.

Beginning January 1, 1971, each operator of an underground coal mine shall conduct refresher first-aid training courses each calendar year for all selected supervisory employees, and make available refresher first-aid training courses to all miners employed in the mine.

§ 75.1713-6 First-aid training program; minimum requirements.

(a) All first-aid training programs required under the provisions of §§ 75.1713-3 and 75.1713-4 shall include 10 class hours of training in a course of instruction similar to that outlined in "First Aid, A Bureau of Mines Instruction Manual."

(b) Refresher first-aid training programs required under the provisions of § 75.1713-5 shall include five class hours of refresher training in a course of instruction similar to that outlined in "First Aid, A Bureau of Mines Instruction Manual."

§ 75.1713-7 First-aid equipmen ion; minimum requirements.

(a) Each operator of an underground coal mine shall maintain a supply of the first-aid equipment set forth in paragraph (b) of this § 75.1713-7 at each of the following locations:

(1) At the mine dispatcher's office or other appropriate work area on the surface in close proximity to the mine entry;

(2) At the bottom of each regularly traveled slope or shaft; however, where the bottom of such slope or shaft is not more than 1,000 feet from the surface, such first-aid supplies may be maintained on the surface at the entrance to the mine; and

(3) At a point in each working section not more than 500 feet outby the active working face or faces.

(b) The first-aid equipment required to be maintained under the provisions of paragraph (a) of this § 75.1713-7 shall include at least the following:

(1) One stretcher;

(2) One broken-back board. (If a splint stretcher combination is used it will satisfy the requirements of both (1) and (2)).

(3) 24 triangular bandages (15 if a splint-stretcher combination is used).

(4) Eight 4-inch bandage compresses;

(5) Eight 2-inch bandage compresses.

(6) Twelve 1-inch adhesive compresses;

(7) One foille;

(8) Two cloth blankets:

(9) One rubber blanket or equivalent substitute.

(10) Two tourniquets;

(11) One 1-ounce bottle of aromatic spirits of ammonia or 1 dozen ammonia ampules.

(12) The necessary complements of arm and leg splints or two each inflatable plastic arm and leg splints.

(c) All first-aid supplies required to be maintained under the provisions of paragraphs (a) and (b) of this § 75.1713-7 shall be stored in suitable, sanitary, dust tight, moisture proof containers and such supplies shall be accessible to the miners.

§ 75.1714 Availability of approved self-rescue devices; instruction in use and location.

(a) Each operator shall make available to each miner employed by the operator who goes underground and to visitors authorized to enter the mine by the operator a self-rescue device or devices approved by the Secretary which is adequate to protect such person for one hour or longer.

(b) Before any miner employed by the operator or visitor authorized by the operator goes underground the operator shall instruct and train such person in the use and location of the self-rescue device or devices made available at the mine. Instruction and training of miners shall include instruction in use, care, and maintenance of the device in accordance with provisions set forth in 30 CFR Part 48.

(Sec. 101, Pub. L. 91-173 as amended by Pub. L. 95-164, 83 Stat. 745 as amended by 91 Stat. 1291 (30 U.S.C. 811))

[43 FR 54246, Nov. 21, 1978, as amended at 43 FR 56894, Dec. 5, 1978]

§ 75.1714-1 Approved self-rescue devices.

The requirements of § 75.1714 shall be met by making available to each person referred to in that section a self-rescue device or devices as follows:

(a) Until June 21, 1981 a self-rescue device or devices which have been approved under:

(1) Bureau of Mines Schedule 14F, Gas Masks, April 23, 1955, as amended (Part 13, 30 CFR, 1972 ed.); or

(2) Subpart I of Part 11 of this chapter; or

(3) Subpart H of Part 11 of this chapter, as follows:

(i) A 1-hour self-contained self-rescue device; or

(ii) A self-contained self-rescue device of not less than 10 minutes and a 1-hour canister; or

(iii) Any other self-contained breathing apparatus approved under Subpart H of Part 11 of this chapter which provides protection for a period of 1 hour or longer and which is approved for use by MSHA for the purpose of a self-rescue device or devices when used and maintained as prescribed by MSHA.

(b) After June 21, 1981 a self-rescue device or devices which have been approved under Subpart H of Part 11 of this chapter, as follows:

(1) A 1-hour self-contained self-rescue device; or

(2) A self-contained self-rescue device of not less than 10 minutes and a 1-hour canister; or

(3) Any other self-contained breathing apparatus approved under Subpart H of Part 11 of this chapter which provides protection for a period of 1 hour or longer and which is approved for use by MSHA for the purpose of a self-rescue device or devices when used and maintained as prescribed by MSHA.

(Sec. 101, Pub. L. 91-173 as amended by Pub. L. 95-164, 83 Stat. 745 as amended by 91 Stat. 1291 (30 U.S.C. 811))

[43 FR 54246, Nov. 21, 1978, as amended at 45 FR 80502, Dec. 5, 1980]

§ 75.1714-2 Self-rescue devices; use and location requirements.

(a) Self-rescue devices shall be used and located as prescribed in paragraphs (b) through (f) of this section.

(b) Except as provided in paragraph (c), (d), (e), or (f) of this section, self-rescue devices shall be worn or carried at all times by each person when underground.

(c) Where the wearing or carrying of the self-rescue device is hazardous to the person, it shall be placed in a readily accessible location no greater than 25 feet from such person.

(d) Where a person works on or around equipment, the self-rescue device may be placed in a readily accessible location on such equipment.

(e) A mine operator may apply to the District Manager under 30 CFR 75.1101-23 for permission to place the self-contained self-rescue device more than 25 feet away.

(1) The District Manager shall consider the following factors in deciding whether to permit an operator to place a self-contained self-rescue device more than 25 feet from a miner:

(i) Distance from affected sections to surface,

(ii) Pitch of seam in affected sections,

(iii) Height of coal seam in affected sections,

(iv) Location of escapeways,

(v) Proposed location of self-contained self-rescuers,

(vi) Type of work performed by affected miners,

(vii) Degree of risk to which affected miners are exposed,

(viii) Potential for breaking into oxygen deficient atmospheres,

(ix) Type of risk to which affected miners are exposed,

(x) Accident history of mine, and

(xi) Other matters bearing upon the safety of miners.

(2) Such application shall not be approved by the District Manager unless it provides that all miners whose self-contained self-rescuer is more than 25 feet away shall have, in accordance with paragraphs (b), (c), and (d) of this section, at all times while underground, a self-rescue device approved under Subpart I of Part 11 of this chapter or Bureau of Mines Schedule 14F, Gas Masks, April 23, 1955, as amended (Part 13, 30 CFR, 1972 ed.) sufficient to enable each miner to get to a self-contained self-rescuer.

(3) An operator may not obtain permission under paragraph (e) of this section to place self-contained self-rescuers more than 25 feet away from miners on mantrips into and out of the mine.

(f) If a self-contained self-rescue device is not carried out of the mine at the end of a miner's shift, the place of storage must be approved by the District Manager, a sign with the word "SELF-RESCUER" or "SELF-RESCUERS" shall be conspicuously posted at each storage place, and direction signs shall be posted leading to each storage place.

(g) Where devices of not less than 10 minutes and 1 hour are made available in accordance with § 75.1714-1(a)(3)(ii) or § 75.1714-1(b)(2), such devices shall be used and located as follows:

(1) Except as provided in paragraphs (c) and (d) of this section, the device of not less than 10 minutes shall be worn or carried at all times by each person when underground, and

(2) The 1-hour canister shall be available at all times to all persons when underground in accordance with a plan submitted by the operator of the mine and approved by the District Manager. When the 1-hour canister is placed in a cache or caches, a sign with the word "SELF-RESCUERS" shall be conspicuously posted at each cache, and direction signs shall be posted leading to each cache.

(Sec. 101, Pub. L. 91-173 as amended by Pub. L. 95-164, 83 Stat. 745 as amended by 91 Stat. 1291 (30 U.S.C. 811))

[43 FR 54246, Nov. 21, 1978]

§ 75.1714-3 Self-rescue devices; inspection, testing, maintenance, repair, and recordkeeping.

(a) Each operator shall provide for proper inspection, testing, maintenance, and repair of self-rescue devices by a person trained to perform such functions.

(b) After each time a self-rescue device is worn or carried by a person, the device shall be inspected for damage and for the integrity of its seal by a person trained to perform this function. Self-rescue devices with broken seals or which are damaged so that the device will not function properly shall be removed from service.

(c) All self-rescue devices approved under Subpart I of Part 11 of this chapter or Bureau of Mines Schedule 14F, April 23, 1955, as amended (Part 13, 30 CFR, 1972 ed.) except devices using vacuum containers as the only method of sealing, shall be tested at intervals not exceeding 90 days by weighing each device on a scale or balance accurate to within ± 1 gram. A device that weighs more than 10 grams over its original weight shall be removed from service.

(d) All self-contained self-rescue devices approved under Subpart H of Part 11 of this chapter shall be tested in accordance with instructions approved by MSHA. Any device which does not meet the specified test requirements shall be removed from service.

(e) Results of the tests required by paragraphs (c) and (d) of this section shall be recorded for each self-rescue device in a book which shall be made available to an authorized representative of the Secretary.

(f) Self-rescue devices removed from service shall be repaired for return to service only by a person trained to perform such work and only in accordance with the manufacturer's instructions.

OMB Control No. 1219-0044. (47 FR 14706, Apr. 6, 1982)

(Sec. 101, Pub. L. 91-173 as amended by Pub. L. 95-164, 83 Stat. 745 as amended by 91 Stat. 1291 (30 U.S.C. 811) (Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[43 FR 54246, Nov. 21, 1978, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.1715 Identification check system.

[Statutory Provisions]

Each operator of a coal mine shall establish a check-in and check-out system which will provide positive identification of every person underground, and will provide an accurate record of the persons in the mine kept on the surface in a place chosen to minimize the danger of destruction by fire or other hazard. Such record shall bear a number identical to an identification check that is securely fastened to the lamp belt worn by the person underground. The identification check shall be made of a rust resistant metal of not less than 16 gauge.

§ 75.1716 Operations under water.

[Statutory Provisions]

Whenever an operator mines coal from a coal mine opened after March 30, 1970, or from any new working section of a mine opened prior to such date, in a manner that requires the construction, operation, and maintenance of tunnels under any river, stream, lake, or other body of water, that is, in the judgment of the Secretary, sufficiently large to constitute a hazard to miners, such operator shall obtain a permit from the Secretary which shall include such terms and conditions as he deems appropriate to protect the safety of miners working or passing through such tunnels from caveins and other hazards. Such permits shall require, in accordance with a plan to be approved by the Secretary, that a safety zone be established beneath and adjacent to such body of water. No plan shall be approved unless there is a minimum of cover to be determined by the Secretary, based on test holes drilled by the operator in a manner to be prescribed by the Secretary. No such permit shall be required in the case of any new working section of a mine which is located under any water resource reservoir being constructed by a Federal agency on December 30, 1969, the operator of which is required by such agency to operate in a manner that protects the safety of miners working in such section from cave-ins and other hazards.

OMB Control No. 1219-0020. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14696, Apr. 6, 1982]

§ 75.1716-1 Operations under water; notification by operator.

An operator planning to mine coal from coal mines opened after March 30, 1970, or from working sections in mines opened prior to such date, and in such manner that mining operations will be conducted, or tunnels constructed, under any river, stream, lake, or other body of water, shall give notice to the Coal Mine Safety District Manager in the district in which the mine is located prior to the commencement of such mining operations.

§ 75.1716-2 Permit required.

If in the judgment of the Coal Mine Safety District Manager the proposed mining operations referred to in § 75.1716-1 constitute a hazard to miners, he shall promptly so notify the operator that a permit is required.

§ 75.1716-3 Applications for permits.

An application for a permit required under this section shall be filed with the Coal Mine Safety District Manager and shall contain the following general information:

(a) Name and address of the company.

(b) Name and address of the mine.

(c) Projected mining and ground support plans.

(d) A mine map showing the locations of the river, stream, lake, or other body of water and its relation to the location of all working places.

(e) A profile map showing the type of strata and the distance in elevation between the coal bed and the river, stream, lake or other body of water involved. The type of strata shall be determined by core test drill holes as prescribed by the Coal Mine Safety District Manager.

§ 75.1716-4 Issuance of permits.

If the Coal Mine Safety District Manager determines that the proposed mining operations under water can be safely conducted, he shall issue a permit for the conduct of such operations under such conditions as he deems necessary to protect the safety of miners engaged in those operations.

§ 75.1717 Exemptions.

[STATUTORY PROVISIONS]

No notice under § 75.1716-1 and no permit under § 75.1716-2 shall be required in the case of any new working section of a mine which is located under any water resource reservoir being constructed by a Federal agency as of December 30, 1969, and where the operator is required by such agency to operate in a manner that adequately protects the safety of miners.

§ 75.1718 Drinking water.

[STATUTORY PROVISIONS]

An adequate supply of potable water shall be provided for drinking purposes in the active workings of the mine, and such water shall be carried, stored, and otherwise protected in sanitary containers.

§ 75.1718-1 Drinking water; quality.

(a) Potable water provided in accordance with the provisions of § 75.1718 shall meet the applicable minimum health requirements for drinking water established by the State or community in which the mine is located.

(b) Where no state or local health requirements apply to drinking water or where no state or local minimum health requirements exist, drinking water provided in accordance with the provisions of § 75.1718 shall contain a minimum of 0.2 milligrams of free chlorine per liter of water.

§ 75.1719 Illumination; purpose and scope of §§ 75.1719 through 75.1719-4; time for compliance.

(a) Section 317(e) of the Act (30 U.S.C. 877(e)) directs and authorizes the Secretary to propose and promulgate standards under which all working places in a mine shall be illuminated by permissible lighting while persons are working in such places §§ 75.1719 through 75.1719-4 prescribe the requirements for illumination of working places in underground coal mines while persons are working in such places and and while self-propelled mining equipment is operated in the working place.

(b) Mine operators shall comply with §§ 75.1719 through 75.1719-4 not later than July 1, 1978.

[41 FR 43534, Oct. 1, 1976, as amended at 43 FR 13564, Mar. 31, 1978]

§ 75.1719-1 Illumination in working places.

(a) Each operator of an underground coal mine shall provide each working place in the mine with lighting as prescribed in §§ 75.1719-1 and 75.1719-2 while self-propelled mining equipment is operated in the working place.

(b) *Self-propelled mining equipment; definition.* For the purposes of §§ 75.1719 through 75.1719-4, "self-propelled mining equipment" means equipment which possesses the capability of moving itself or its associated components from one location to another by electric, hydraulic, pneumatic, or mechanical power supplied by a source located on the machine or transmitted to the machine by cables, ropes, or chains.

(c) The lighting prescribed in this section shall be in addition to that provided by personal cap lamps.

(d) The luminous intensity (surface brightness) of surfaces that are in a miner's normal field of vision of areas in working places that are required to be lighted shall be not less than 0.06 footlamberts when measured in accordance with § 75.1719-3.

(e) When self-propelled mining equipment specified in paragraphs (e)(1) through (e)(6) of this section is operated in a working place, the areas within a miner's normal field of vision which shall be illuminated in the working place shall be as prescribed in paragraphs (e)(1) through (e)(6) of this section.

(1) *Continuous miners and coal-loading equipment.* In working places in which continuous miners and coal-loading equipment are operated, the areas which shall be illuminated shall be as follows:

(i) The face, and

(ii) The ribs, roof, floor, and exposed surface of mining equipment, which are between the face and the inby end of the shuttle car or other conveying equipment while in position to receive material.

(2) *Self-loading haulage equipment used as a loading machine.* In working places in which self-loading haulage equipment is operated to load material, the areas which shall be illuminated shall be as follows:

(i) The face, and

(ii) The ribs, roof, floor, and exposed surfaces of mining equipment, which are between the face and a point 5 feet outby the machine.

(3) *Cutting and drilling equipment.* In working places in which cutting or drilling equipment is operated, the areas which shall be illuminated shall be as follows:

(i) The ribs, roof, floor, and exposed surfaces of mining equipment, which are between the face and a point 5 feet outby the machine.

(4) *Shortwall and longwall mining equipment.* In working places in which shortwall or longwall mining equipment is operated, the areas which shall be illuminated shall be as follows:

(i) The area for the length of the self-advancing roof suport system and which is between the gob-side of the travelway and the side of the block of coal from which coal is being extracted, and

(ii) The control station, and the head piece and tail piece of the face conveyor, and

(iii) The roof and floor for a distance of 5 feet horizontally from the control station, head piece and tail piece.

(5) *Roof bolting equipment.* In working places in which roof bolting equipment is operated, the areas which shall be illuminated shall be as follows:

(i) *Where the distance from the floor, to the roof is 5 feet, or less:* the face, ribs, roof, floor, and exposed surfaces of mining equipment, which are within an area the perimeter of which is a distance of 5 feet from the machine, when measured parallel to the floor.

(ii) *Where the distance from the floor to the roof is more than 5 feet:* the face, ribs, roof, floor, and exposed surfaces of mining equipment, which are within an area the perimeter of which from the front and sides of the machine is a distance equal to the distance from the floor to the roof and from the rear of the machine a distance of 5 feet, when measured parallel to the floor.

(6) *Other self-propelled equipment.* Unless the entire working place is illuminated by stationary lighting equipment, in working places in which self-propelled equipment is operated, other than equipment specified in paragraphs (e)(1) through (e)(5) of this section, illumination shall be provided as follows:

(i) Luminaires shall be installed on each machine operated in the working place which shall illuminate a face or rib coal surface which is within 10 feet of the front and the rear of the machine to a luminous intensity of not less than 0.06 footlamberts, and

(ii) The height and width of the area of the coal surface which shall be illuminated shall equal the height and width, respectively, of the machine on which the luminaires are installed, and

(iii) The luminaires in the direction of travel shall be operated at all times the equipment is being trammed in the working place.

(f) The Administrator, Coal Mine Health and Safety, MSHA, may specify other areas in a working place to be illuminated for the protection of miners while self-propelled mining equipment is being operated in the working place.

(g) Surface brightness of floor, roof, coal and machine surfaces in the normal visual field of a miner shall not vary more than 50 percent between adjacent fields of similar surface reflectance, and the maximum surface brightness of such surface shall not exceed 120 footlamberts when measured in accordance with § 75.1719-3.

[41 FR 43534, Oct. 1, 1976, as amended at 42 FR 18859, Apr. 11, 1977; 43 FR 43458, Sept. 26, 1978; 47 FR 28096, June 29, 1982]

§ 75.1719-2 Lighting fixtures; requirements.

(a) Lighting fixtures shall be permissible.

(b) Lighting fixtures may be installed on self-propelled machines or may be stationary lighting fixtures.

(c)(1) Electrically operated lighting fixtures shall be energized by direct current, or by sinusoidal full wave alternating current not less than 50 cycles per second (100 pulses per second), or by an equivalent power source that causes no greater flicker.

(2) Alternating current circuits supplying power to stationary lighting fixtures shall contain conductors energized at voltages not greater than 70 volts to ground. Alternating current circuits, energized at 100 volts or more and used to supply power to staionary lighting fixtures, shall originate at a transformer having a center or neutral tap grounded to earth through a proper resistor, which shall be designed to limit fault current to not more than 5 amperes. A grounding circuit in accordance with § 75.701-4 shall orignate at the grounded terminal of the grounding resistor and extend along with the power conductors and serve as a grounding conductor for the frames of all equipment receiving power from the circuit. The ground fault current rating of grounding resistors shall meet the "extended time rating" set forth in the Institute of Electrical and Electronics Engineers, Inc. Standard No. 32 (IEEE Std. 32-1972) which is hereby incorporated by reference and made a part hereof. The incorporated publication is available for examination at each Coal Mine Health and Safety District and Subdistrict Office of MSHA, and may be obtained from the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, N.Y. 10017.

(3) Machine-mounted lighting fixtures shall be electrically grounded to the machine by a separate grounding conductor in compliance with § 75.701-4.

(d) Direct current circuits in excess of a nominal voltage of 300 volts shall not be used to supply power to stationary light fixtures.

(e) Cables conducting power to stationary lighting fixtures from both alternating and direct current power sources, other than intrinsically safe devices, shall be considered trailing cables, and shall meet rhe requirements of Subpart G of this part. In addition, such cables shall be protected against overloads and short circuits by a suitable circuit breaker or other device approved by the Secretary. Circuit breakers or other device approved by the Secretary protecting trailing cables receiving power from resistance grounded circuits shall be equipped with a ground trip arrangement which shall be designed to deenergize the circuit at not more than 50% of the available fault current.

(f) Before shunts are removed from blasting caps, lighting fixtures and associated cables located in the same working place shall be deenergized. Furthermore, lighting fixtures shall be removed out of the line of blast and not less than 50 feet from the blasting operation unless otherwise protected against flying debris.

(g) Lighting fixtures shall be designed and installed to minimize discomfort glare.

[41 FR 43534, Oct. 1, 1976]

§ 75.1719-3 Methods of measurement; light measuring instruments.

(a) Compliance with § 75.1719-1(d) shall be determined by MSHA by measuring luminous intensity (surface brightness).

(b) In measuring luminous intensity the following procedures shall be used:

(1) In areas of working places specified in §§ 75.1719.1(e)(1) through 75.1719-1(e)(3) luminous intensity measurements of the face, ribs, roof, floor, and exposed surfaces of mining equipment, shall be made with the machine idle and located in the approximate center of the working place with

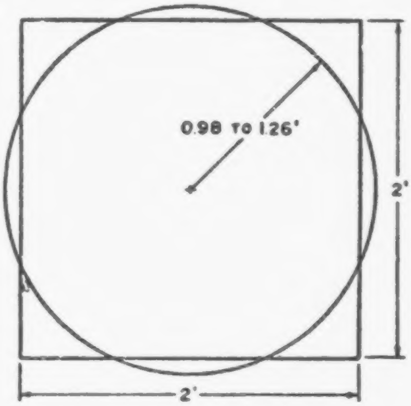
the cutting, loading, or drilling head toward the face and not more than 3 feet from the face.

(2) In areas of working places specified in § 75.1719-1(e)(4) luminous intensity measurements may be made at any time longwall or shortwall mining equipment is operated except that when measurements are made in the vicinity of shearers, plows, or continuous miners, the equipment shall be idle while measurements are being made.

(3) In areas of working places specified in § 75.1719-1(e)(5) luminous intensity measurements of the face, ribs, roof, floor, and exposed surfaces of mining equipment, shall be made with the machine idle and located in the approximate center of the working place with the drilling head toward the face and a distance from the face of 5 feet, or the distance from the floor to the roof, whichever is applicable. When the machine is located in the center of the working place and the surfaces of the ribs to be illuminated are not within the perimeter of the area determined in accordance with § 75.1719-1(e)(5), the machine shall be positioned the applicable distance from the face and each rib and luminous intensity measurements made for each rib, provided, however, that luminous intensity measurements may be made of the face, roof, floor, and exposed surfaces of mining equipment with the machine so located without locating the machine in the center of the working place.

(4) In areas of working places specified in § 75.1719-1(e)(6), luminous intensity measurements of a coal surface shall be made with the machine idle and located in the approximate center of the working place with the appropriate end toward the face and not less than 9 feet nor more than 10 feet from the face.

(5) The area of surfaces to be measured shall be divided into round or square fields having an area of not less than 3 nor more than 5 square feet as illustrated by the following figure:

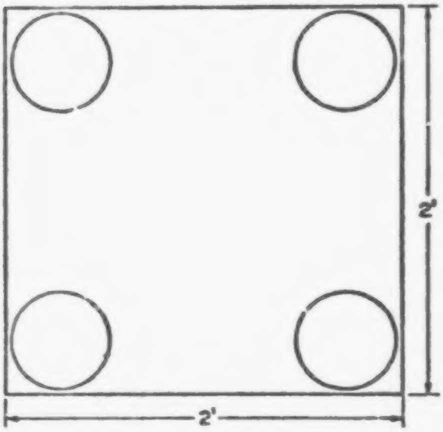


DIRECT MEASUREMENT OF LUMINOUS INTENSITY

(6) Measurements shall be taken with the photometer held approximately perpendicular to the surface being measured and a sufficient distance from the surface to allow the light sensing element in the instrument to receive reflected light from a field of not less than 3 nor more than 5 square feet. The luminous intensity of each such field shall be not less than 0.06 footlambert.

(7) In areas of working places where clearances are restricted to the extent that the photometer cannot be held a sufficient distance from the surface to allow the light sensing element in the instrument to receive reflected light from a field having an area of at least 3 square feet, luminous intensity shall be considered as the average of four uniformly spaced readings taken at the corners and within a square field having an area of approximately 4

square feet. In such instances, the area of each of the individual readings shall not exceed 100 square inches. The average of the four readings shall be not less than 0.06 footlambert. The method of measurement is illustrated by the following figure:



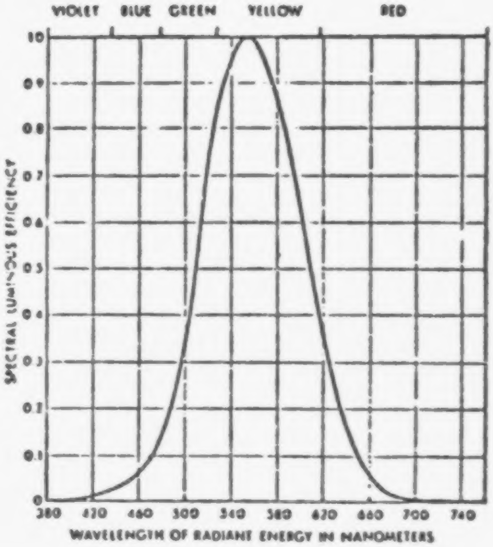
DETERMINATION OF LUMINOUS INTENSITY BY AVERAGING METHOD

(8) Measurements shall not be made where shadows are cast by roof control posts, ventilation equipment, or other obstructions necessary to insure safe mining conditions.

(9) Where machine-mounted light fixtures are used on equipment, except self advancing roof support systems, measurements shall not be made of surfaces on or within 1 foot of a self-propelled machine.

(c) For the purpose of making illumination measurements, an authorized representative of the Secretary may require the installation of temporary roof supports or the removal of the equipment to a similar working place in which permanent roof supports have been installed.

(d) Light measuring instruments shall be properly calibrated and maintained. Instruments shall be calibrated against standards traceable to the National Bureau of Standards and color corrected to the Commission Internationale de l'Eclairage (CIE) Spectral Luminous Curve. The CIE Spectral Luminous Curve is as follows:



[41 FR 43534, Oct. 1, 1976]

§ 75.1719-4 Mining machines, cap lamps; requirements.

(a) Paint used on exterior surfaces of mining machines shall have a minimum reflectance of 30 percent, except cab interiors and other surfaces which might adversely affect visibility.

(b) When stationary light fixtures are used, red reflectors mounted in protective frames or reflecting tape shall be installed on each end of mining machines, except that continuous mining machines, loaders, and cutters need only have such reflectors or tape on the outby end. Reflectors or reflecting tape shall have an area of not less than 10 square inches.

(c) Each person who goes underground shall be required to wear an approved personal cap lamp or an equivalent portable light.

(d) Each person who goes underground shall be required to wear a hard hat or hard cap which shall have a minimum of 6 square inches of reflecting tape or equivalent paint or material on each side and back.

[41 FR 43534, Oct. 1, 1976]

§ 75.1720 Protective clothing; requirements.

On and after the effective date of this § 75.1720 each miner regularly employed in the active workings of an underground coal mine shall be required to wear the following protective clothing and devices:

(a) Protective clothing or equipment and face-shields or goggles when welding, cutting, or working with molten metal or when other hazards to the eyes exist from flying particles.

(b) Suitable protective clothing to cover those parts of the body exposed to injury when handling corrosive or toxic substances or other materials which might cause injury to the skin.

(c) Protective gloves when handling materials or performing work which might cause injury to the hands; however, gloves shall not be worn where they would create a greater hazard by becoming entangled in the moving parts of equipment.

(d) A suitable hard hat or hard cap. If a hard hat or hard cap is painted, nonmetallic based paint shall be used.

(e) Suitable protective footwear.

(Sec. 101(a) of the Federal Coal Mine Health and Safety Act of 1969, as amended (83 Stat. 745; 30 U.S.C. 811(a)))

[36 FR 19497, Oct. 7, 1971, as amended at 39 FR 7175, Feb. 25, 1974]

§ 75.1720-1 Distinctively colored hard hats, or hard caps; identification for newly employed, inexperienced miners.

Hard hats or hard caps distinctively different in color from those worn by experienced miners shall be worn by each newly employed, inexperienced miner for at least one year from the date of his initial employment as a miner or until he has been qualified or certified as a miner by the State in which he is employed.

(Sec. 101(a) of the Federal Coal Mine Health and Safety Act of 1969, as amended (83 Stat. 745; 30 U.S.C. 811(a)))

[39 FR 7175, Feb. 25, 1974]

§ 75.1721 Opening of new underground coal mines, or reopening and reactivating of abandoned or deactivated coal mines, notification by the operator; requirements.

(a) Each operator of a new underground coal mine, and a mine which has been abandoned or deactivated and is to be reopened or reactivated, shall prior to opening, reopening or reactivating the mine notify the Coal Mine Health and Safety District Manager for the district in which the mine is located of the approximate date of the proposed or actual opening of such mine. Thereafter, and as soon as practicable, the operator of such mine shall submit all preliminary plans in accordance with paragraphs (b) and (c) of this section to the District Manager and the operator shall not develop any part of the coalbed in such mine unless and until all preliminary plans have been approved.

(b) The preliminary plans required to be submitted by the operator to the District Manager shall be in writing and shall contain the following:

(1) The name and location of the proposed mine and the Mine Safety and Health Administration mine identification number, if known;

(2) The name and address of the mine operator(s);

(3) The name and address of the principal official designated by the operator as the person who is in charge of health and safety at the mine;

(4) The identification and approximate height of the coalbed to be developed;

(5) The system of mining to be employed;

(6) A proposed roof control plan containing the information specified in § 75.200-5;

(7) A proposed ventilation plan and methane and dust control plan containing the information specified in §§ 75.316-1 and 75.316-2;

(8) A proposed plan for sealing abandoned areas containing the information specified in § 75.330-1;

(9) A proposed program for searching miners for smoking materials in accordance with the provisions of § 75.1702; and,

(10) A proposed plan for emergency medical assistance and emergency communication in accordance with the provisions of §§ 75.1713-1 and 75.1713-2.

(c) The preliminary plans required to be submitted by the operator to the District Manager shall be in writing and shall contain the following:

(1) The proposed training plan containing the information specified in §§ 48.3 and 48.23 of this chapter, and

(2) A proposed plan for training and retraining certified and qualified persons containing the information specified in § 75.160-1.

[44 FR 9380, Feb. 13, 1979, as amended at 47 FR 23641, May 28, 1982]

§ 75.1722 Mechanical equipment guards.

(a) Gears; sprockets; chains; drive, head, tail, and takeup pulleys; flywheels; couplings, shafts; sawblades; fan inlets; and similar exposed moving machine parts which may be contacted by persons, and which may cause injury to persons shall be guarded.

(b) Guards at conveyor-drive, conveyor-head, and conveyor-tail pulleys shall extend a distance sufficient to prevent a person from reaching behind the guard and becoming caught between the belt and the pulley.

(c) Except when testing the machinery, guards shall be securely in place while machinery is being operated.

(Sec. 101 Federal Coal Mine Health and Safety Act of 1969; 83 Stat. 745; 30 U.S.C. 811)

[38 FR 4976, Feb. 23, 1973]

§ 75.1723 Stationary grinding machines; protective devices.

(a) Stationary grinding machines other than special bit grinders shall be equipped with:

(1) Peripheral hoods (less than 90° throat openings) capable of withstanding the force of a bursting wheel.

(2) Adjustable tool rests set as close as practical to the wheel.

(3) Safety washers.

(b) Grinding wheels shall be operated within the specifications of the manufacturer of the wheel.

(c) Face shields or goggles, in good condition, shall be worn when operating a grinding wheel.

(Sec. 101 Federal Coal Mine Health and Safety Act of 1969; 83 Stat. 745; 30 U.S.C. 811)

[38 FR 4976, Feb. 23, 1973]

§ 75.1724 Hand-held power tools; safety devices.

Hand-held power tools shall be equipped with controls requiring constant hand or finger pressure to operate the tools or shall be equipped with friction or other equivalent safety devices.

(Sec. 101 Federal Coal Mine Health and Safety Act of 1969; 83 Stat. 745; 30 U.S.C. 811)

[38 FR 4976, Feb. 23, 1973]

§ 75.1725 Machinery and equipment; operation and maintenance.

(a) Mobile and stationary machinery and equipment shall be maintained in safe operating condition and machinery or equipment in unsafe condition shall be removed from service immediately.

(b) Machinery and equipment shall be operated only by persons authorized to operate such machinery or equipment.

(c) Repairs or maintenance shall not be performed on machinery until the power is off and the machinery is blocked against motion, except where machinery motion is necessary to make adjustments.

(d) Machinery shall not be lubricated manually while in motion, unless equipped with extended fittings or cups.

(Sec. 101 Federal Coal Mine Health and Safety Act of 1969; 83 Stat. 745; 30 U.S.C. 811)

[38 FR 4976, Feb. 23, 1973]

§ 75.1726 Performing work from a raised position; safeguards.

(a) Men shall not work on or from a piece of mobile equipment in a raised position until it has been blocked in place securely. This does not preclude the use of equipment specifically designed as elevated mobile work platforms.

(b) No work shall be performed under machinery or equipment that has been raised until such machinery or equipment has been securely blocked in position.

(Sec. 101 Federal Coal Mine Health and Safety Act of 1969; 83 Stat. 745; 30 U.S.C. 811)

[38 FR 4976, Feb. 23, 1973]

§ 75.1727 Drive belts.

(a) Drive belts shall not be shifted while in motion unless the machines are provided with mechanical shifters.

(b) Belt dressing shall not be applied while belts are in motion except where it can be applied without endangering a person.

(Sec. 101 Federal Coal Mine Health and Safety Act of 1969; 83 Stat. 745; 30 U.S.C. 811)

[38 FR 4976, Feb. 23, 1973]

§ 75.1728 Power-driven pulleys.

(a) Belts, chains, and ropes shall not be guided onto power-driven moving pulleys, sprockets, or drums with the hands except on slow-moving equipment especially designed for hand feeding.

(b) Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

(c) Coal spilled beneath belt conveyor drives or tail pieces shall not be removed while the conveyor is in motion, except where such coal can be removed without endangering persons.

(Sec. 101 Federal Coal Mine Health and Safety Act of 1969; 83 Stat. 745; 30 U.S.C. 811)

[38 FR 4976, Feb. 23, 1973]

§ 75.1729 Welding operations.

Welding operations shall be shielded and the area shall be well ventilated.

(Sec. 101 Federal Coal Mine Health and Safety Act of 1969; 83 Stat. 745; 30 U.S.C. 811)

[38 FR 4976, Feb. 23, 1973]

§ 75.1730 Compressed air; general; compressed air systems.

(a) All pressure vessels shall be constructed, installed, and maintained in accordance with the standards and specifications of Section VIII "Unfired Pressure Vessels," of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (1971), which is hereby incorporated by reference and made a part hereof. This document may be purchased for $25 from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017; and it is available for examination in every Coal Mine Health and Safety District and Subdistrict Office.

(b) Compressors and compressed-air receivers shall be equipped with automatic pressure-relief valves, pressure gages, and drain valves.

(c) Repairs involving the pressure system of compressors, receivers, or compressed-air-powered equipment shall not be attempted until the pressure has been relieved from that part of the system to be repaired.

(d) At no time shall compressed air be directed toward a person. When compressed air is used, all necessary precautions shall be taken to protect persons from injury.

(e) Safety chains, suitable locking devices, or automatic cut-off valves shall be used at connections to machines of high-pressure hose lines of three-fourths of an inch inside diameter or larger, and between high-pressure hose lines of three-fourths of an inch inside diameter or larger, where a connection failure would create a hazard. For purposes of this paragraph, high-pressure means pressure of 100 p.s.i. or more.

(Sec. 101 Federal Coal Mine Health and Safety Act of 1969; 83 Stat. 745; 30 U.S.C. 811)

[38 FR 4976, Feb. 23, 1973]

Subpart S—Approved Books and Records

§ 75.1800 Scope.

(a) The provisions of this Subpart S set forth the requirements for recording the results of certain tests and examinations conducted in underground coal mines. In addition, it specifies the approved books in which such results are to be recorded and the manner in which they shall be maintained.

(b) The approved books required to be maintained in accordance with the provisions of §§ 75.1801 through 75.1808 shall be secured by each operator from commercial sources. Facsimile copies of Mine Safety and Health Administration Forms 6-1331, 6-1489, 6-1490, 6-1491, 6-1492, 6-1493, and 6-1494, have been filed with the Office of the Federal Register, General Services Administration, Washington, D.C. 20408, and sample copies of each of these forms are available for the use of commercial printers or operators at each District or Subdistrict Coal Mine

Health and Safety Office of the Mine Safety and Health Administration.

(c) When the District Manager has determined that record books kept in satisfaction of State requirements provide the information specified in any record book required by this Subpart S, and so advises the operators of mines located in that State, such approved State record books will be accepted in lieu of the record books specified in this Subpart S.

§ 75.1801 Examination of emergency escapeways and facilities, smokers' articles and fire doors; recording requirements; approved books.

The results of examinations of emergency escapeways and facilities, fire doors, and for smokers' articles required to be conducted under the provisions of §§ 75.1702, 75.1704, and 75.1708, shall be recorded in a book entitled "Examinations of Emergency Escapeways and Facilities; Smokers' Articles; Fire Doors" (Mine Safety and Health Administration Form 6-1331, Budget Bureau No. 42-R1589, March 1970).

§ 75.1802 Preshift—Onshift and daily report; recording requirements; approved books.

The results of daily examinations and tests for hazardous conditions and roof bolt torque required to be conducted under the provisions of §§ 75.200-7(b)(3)(iii), 75.303, 75.304, 75.304-2, 75.309, 75.309-4, and 75.324, shall be recorded in a book entitled "Preshift—Onshift and Daily Report" (Mine Safety and Health Administration Form 6-1439, Budget Bureau No. 42-R1589, March 1970).

§ 75.1803 Weekly examinations for methane and hazardous conditions; recording requirements; approved books.

The results of weekly examinations for methane and hazardous conditions required to be conducted under the provisions of §§ 75.305, 75.306, and 75.316-2(f), shall be recorded in a book entitled "Weekly Examination for Methane and Hazardous Conditions" (Mine Safety and Health Administration Form 6-1490, Budget Bureau No. 42-R1589, March 1970).

§ 75.1804 Daily and monthly examination of ventilation equipment; recording requirements; approved books.

The results of daily and monthly examinations of ventilation equipment required to be conducted under the provisions of §§ 75.300 and 75.300-4, shall be recorded in a book entitled "Daily and Monthly Examination of Ventilation Equipment" (Mine Safety and Health Administration Form 6-1491, Budget Bureau No. 42-R1589, March 1970).

§ 75.1805 Examination of electrical equipment; recording requirements; approved books.

The results of examinations of electrical equipment required to be conducted under the provisions of §§ 75.313-1, 75.512, 75.512-2, 75.703-3(d)(11), 75.812, 75.812-2, 75.900, 75.900-3, and 75.900-4, shall be recorded in a book entitled "Examination of Electrical Equipment" (Mine Safety and Health Administration Form 6-1492, Budget Bureau No. 42-R1589, March 1970).

OMB Control No. 1219-0067. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.1806 Monthly examination of surface high voltage circuit breakers; recording requirements; approved books.

The results of monthly examinations of high voltage circuit breakers on the surface required to be conducted under the provisions of §§ 75.800, 75.800-3, and 75.800-4, shall be recorded in a book entitled "Monthly Examination of Surface High Voltage Circuit Breakers" (Mine Safety and Health Administration Form 6-1493, Budget Bureau No. 42-R1589, March 1970).

OMB Control No. 1219-0067. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[35 FR 17890, Nov. 20, 1970, as amended at 47 FR 14706, Apr. 6, 1982]

§ 75.1807 Daily inspection of hoisting equipment; recording requirements; approved books.

The results of daily examinations of hoisting equipment required to be conducted under the provisions of §§ 75.1400, 75.1400-2, 75.1400-3, 75.1400-4, 75.1401-3, and 75.1402-2, shall be recorded in a book entitled "Report of Daily Inspection of Hoisting Equipment" (Mine Safety and Health Administration Form 6-1494, Budget Bureau No. 42-R1589, March 1970).

§ 75.1808 Maintenance of approved books and records; requirements.

All approved books and records maintained under the provisions of §§ 75.1801 through 75.1807 shall be stored in a fireproof repository on the surface of the mine chosen by the mine operator to minimize their destruction by fire or other hazard and such records shall be made available to interested persons.

Part 77

PART 77—MANDATORY SAFETY STANDARDS, SURFACE COAL MINES AND SURFACE WORK AREAS OF UNDERGROUND COAL MINES

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Subpart U—Approved Books and Records [Reserved]

AUTHORITY: Secs. 101(i) and 508 of the Federal Coal Mine Health and Safety Act of 1969 (83 Stat. 742, 803; 30 U.S.C. 801, 957; Pub. L. 91-173); secs. 301(a) and 302(a) of the Federal Mine Safety and Health Amendments Act of 1977, Pub. L. 95-164, 30 U.S.C. 961 and 951 and 29 U.S.C. 577a, 91 Stat. 1317 and 91 Stat. 1319; sec. 508 of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 30 U.S.C. 957, 83 Stat. 803, unless otherwise noted.

SOURCE: 36 FR 9364, May 22, 1971, unless otherwise noted.

NOTE: Nomenclature changes appear at 43 FR 12320, March 24, 1978.

Subpart A—General

§ 77.1 Scope.

This Part 77 sets forth mandatory safety standards for bituminous, anthracite, and lignite surface coal mines, including open pit and auger mines, and to the surface work areas of underground coal mines, pursuant to section 101(i) of the Federal Mine Safety and Health Act of 1977.

[36 FR 9364, May 22, 1971, as amended at 43 FR 12320, Mar. 24, 1978]

§ 77.2 Definitions.

For the purpose of this Part 77, the term:

(a) "Active workings" means any place in a coal mine where miners are normally required to work or travel;

(b) "American Table of Distances" means the current edition of "The American Table of Distances for Storage of Explosives" published by the Institute of Makers of Explosives;

(c) "Barricaded" means to obstruct passage of persons, vehicles, or flying materials;

(d) "Berm" means a pile or mound of material capable of restraining a vehicle;

(e) "Blasting agent" means any material consisting of a mixture of a fuel and oxidizer which—

(1) Is used or intended for use in blasting;

(2) Is not classed as an explosive by the Department of Transportation;

(3) Contains no ingredient classed as an explosive by the Department of Transportation; and,

(4) Cannot be detonated by a No. 8 blasting cap when tested as recommended in Bureau of Mines Information Circular 8179.

(f) "Blasting area" means the area near blasting operations in which concussion or flying material can reasonably be expected to cause injury.

(g) "Blasting cap" means a detonator containing a charge of detonating compound, which is ignited by electric current, or the spark of a fuse. Used for detonating explosives.

(h) "Blasting circuit" means electric circuits used to fire electric detonators or to ignite an igniter cord by means of an electric starter.

(i) "Blasting switch" means a switch used to connect a power source to a blasting circuit.

(j) "Box-type magazine" means a small, portable magazine used to store limited quantities of explosives or detonators for short periods of time in locations at the mine which are convenient to the blasting sites at which they will be used.

(k) "Capped fuse" means a length of safety fuse to which a detonator has been attached.

(l) "Capped primer" means a package or cartridge of explosives which is specifically designed to transmit detonation to other explosives and which contains a detonator.

(m) "Certified" or "registered", as applied to any person means a person certified or registered by the State in which the coal mine is located to perform duties prescribed by this Part 77, except that, in a State where no program of certification or registration is provided or where the program does not meet at least minimum Federal standards established by the Secretary, such certification or registration shall be by the Secretary.

(n) "Detonating cord" or "detonating fuse" means a flexible cord containing a core of high explosive.

(o) "Detonator" means a device containing a small detonating charge that is used for detonating an explosive, including, but not limited to blasting caps, exploders, electric detonators, and delay electric blasting caps.

(p) "Electrical grounding" means to connect with the ground to make the earth part of the circuit.

(q) "Explosive" means any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion. Explosives include, but are not limited to black powder, dynamite, nitroglycerin, fulminate, ammonium nitrate when mixed with a hydrocarbon, and other blasting agents.

(r) "Flash point" means the minimum temperature at which sufficient vapor is released by a liquid or solid to form a flammable vapor-air mixture at atmospheric pressure.

(s) "Low voltage" means up to and including 660 volts, "medium voltage" means voltages from 661 to 1,000 volts, and "high voltage" means more than 1,000 volts.

(t) "Misfire" means the complete or partial failure of a blasting charge to explode as planned.

(u) "Primer" or "Booster" means a package or cartridge of explosive which is designed specifically to transmit detonation to other explosives and which does not contain a detonator.

(v) "Qualified person" means, as the context requires,

(1) An individual deemed qualified by the Secretary and designated by the operator to make tests and examinations required by this Part 77; and,

(2) An individual deemed, in accordance with the minimum requirements to be established by the Secretary, qualified by training, education, and experience, to perform electrical work, to maintain electrical equipment, and to conduct examinations and make tests of all electrical equipment.

(w) "Roll protection" means a framework, safety canopy, or similar protection for the operator when equipment overturns.

(x) "Safety can" means an approved container, of not over 5 gallons capacity, having a spring-closing lid and spout cover.

(y) "Safety fuse" means a train of powder enclosed in cotton, jute yarn, and waterproofing compounds, which burns at a uniform rate; used for firing a cap containing the detonating compound which in turn sets off the explosive charge.

(z) "Safety switch" means a sectionalizing switch that also provides shunt protection in blasting circuits between the blasting switch and the shot area.

(aa) "Secretary" means the Secretary of Labor or his delegate.

[36 FR 9364, May 22, 1971, as amended at 43 FR 12320, Mar. 24, 1978]

Subpart B—Qualified and Certified Persons

§ 77.100 Certified person.

(a)(1) The provisions of this Part 77 require that certain examinations and tests be made by a certified person. A certified person within the meaning of these provisions is a person who has been certified in accordance with the provisions of paragraph (b) of this § 77.100 to perform the duties, and make the examinations and tests which are required by this Part 77 to be performed by a certified person.

(2) A person who has been so certified shall also be considered to be a qualified person within the meaning of those provisions of this Part 77 which require that certain examinations, tests and duties be performed by a qualified person, except those provi-

sions in Subparts F, G, H, I, and J of this part relating to performance of electrical work.

(b) Pending issuance of Federal standards, a person will be considered, to the extent of the certification, a certified person to make examinations, tests and perform duties which are required by this Part 77 to be performed by a certified person:

(1) If he has been certified for such purpose by the State in which the coal mine is located; or

(2) If he has been temporarily certified for such purpose by the Secretary for periods of time not to exceed 6 months for each such temporary certification. The operator of the coal mine in which such person is employed shall make an application and a satisfactory showing that each such person has had at least 2 years experience at a coal mine or equivalent experience and such person demonstrates to the satisfaction of an authorized representative of the Secretary that he is able and competent to test for oxygen deficiency with a permissible flame safety lamp and to test for methane with a portable methane detector approved by the Bureau of Mines or the Mining Enforcement and Safety Administration or MSHA under Part 22 of this chapter (Bureau of Mines Schedule 8C), and to perform such other duties for which application for certification is made. Applications for temporary certification by the Secretary should be submitted in writing to the Mine Safety and Health Administration, Certification and Qualification Center, P.O. Box 25367, Denver Federal Center, Denver, Colo. 80225.

[36 FR 9364, May 22, 1971, as amended at 43 FR 12320, Mar. 24, 1978]

§ 77.101 Tests for methane and for oxygen deficiency; qualified person.

(a) The provisions of Subparts C, P, R, and T of this Part 77 require that tests for methane and for oxygen deficiency be made by a qualified person. A person is a qualified person for these purposes if he is a certified person for such purposes under § 77.100.

(b) Pending issuance of Federal standards, a person will be considered a qualified person for testing for methane and oxygen deficiency:

(1) If he has been qualified for this purpose by the State in which the coal mine is located; or

(2) If he has been qualified by the Secretary for these purposes upon a satisfactory showing by the operator of the coal mine that each such person has been trained and designated by the operator to test for methane and oxygen deficiency. Applications for Secretarial qualification should be submitted in writing to the Mine Safety and Health Administration, Certification and Qualification Center, P.O. Box 25367, Denver Federal Center, Denver, Colo. 80225

[36 FR 9364, May 22, 1971, as amended at 43 FR 12320, Mar. 24, 1978]

§ 77.102 Tests for methane; oxygen deficiency; qualified person, additional requirement.

Notwithstanding the provisions of § 77.101, on and after December 30, 1971, no person shall be a qualified person for testing for methane and oxygen deficiency unless he has demonstrated to the satisfaction of an authorized representative of the Secretary that he is able and competent to make such tests and the Mine Safety and Health Administration has issued him a current card which qualifies him to make such tests.

§ 77.103 Electrical work; qualified person.

(a) Except as provided in paragraph (f) of this section, an individual is a qualified person within the meaning of Subparts F, G, H, I, and J of this Part 77 to perform electrical work (other than work on energized surface high-voltage lines) if:

(1) He has been qualified as a coal mine electrician by a State that has a coal mine electrical qualification program approved by the Secretary; or,

(2) He has at least 1 year of experience in performing electrical work underground in a coal mine, in the surface work areas of an underground coal mine, in a surface coal mine, in a noncoal mine, in the mine equipment manufacturing industry, or in any other industry using or manufacturing similar equipment, and has satisfacto-

rily completed a coal mine electrical training program approved by the Secretary; or.

(3) He has at least 1 year of experience, prior to the date of the application required by paragraph (c) of this section, in performing electrical work underground in a coal mine, in the surface work areas of an underground coal mine, in a surface coal mine, in a noncoal mine, in the mine equipment manufacturing industry, or in any other industry using or manufacturing similar equipment, and he attains a satisfactory grade on each of the series of five written tests approved by the Secretary as prescribed in paragraph (b) of this section.

(b) The series of five written tests approved by the Secretary shall include the following categories:

(1) Direct current theory and application;

(2) Alternating current theory and application;

(3) Electric equipment and circuits;

(4) Permissibility of electric equipment; and,

(5) Requirements of Subparts F through J and S of this Part 77.

(c) In order to take the series of five written tests approved by the Secretary, an individual shall apply to the District Manager and shall certify that he meets the requirements of paragraph (a)(3) of this section. The tests will be administered in the Coal Mine Safety and Health Districts at regular intervals, or as demand requires.

(d) A score of at least 80 percent on each of the five written tests will be deemed to be a satisfactory grade. Recognition shall be given to practical experience in that 1 percentage point shall be added to an individual's score in each test for each additional year of experience beyond the 1 year requirement specified in paragraph (a)(3) of this section; however, in no case shall an individual be given more than 5 percentage points for such practical experience.

(e) An individual may, within 30 days from the date on which he received notification from the Administration of his test scores, repeat those on which he received an unsatisfactory score. If further retesting is necessary after his initial repetition, a minimum of 30 days from the date of receipt of notification of the initial retest scores shall elapse prior to such further retesting.

(f) An individual who has, prior to November 1, 1972, been qualified to perform electrical work specified in Subparts F, G, H, I, and J of this Part 77 (other than work on energized surface high-voltage lines) shall continue to be qualified until June 30, 1973. To remain qualified after June 30, 1973, such individual shall meet the requirements of either paragraph (a) (1), (2), or (3) of this section.

(g) An individual qualified in accordance with this section shall, in order to retain qualification, certify annually to the District Manager, that he has satisfactorily completed a coal mine electrical retraining program approved by the Secretary.

(Sec. 101(a), Federal Coal Mine Health and Safety Act of 1969; 30 U.S.C. 811(a); 83 Stat. 745)

[37 FR 22377, Oct. 19, 1972; 37 FR 28163, Dec. 21, 1972, as amended at 44 FR 9380, Feb. 13, 1979; 47 FR 23641, May 28, 1982]

§ 77.104 Repair of energized surface high-voltage lines; qualified person.

An individual is a qualified person within the meaning of § 77.704 of this part for the purpose of repairing energized surface high-voltage lines only if he has had at least 2 years experience in electrical maintenance, and at least 2 years experience in the repair of energized high-voltage lines located on poles or structures.

[36 FR 9364, May 22, 1971, as amended at 36 FR 13143, July 15, 1971]

§ 77.105 Qualified hoistman; slope or shaft sinking operation; qualifications.

(a)(1) A person is a qualified hoistman within the provisions of Subpart T of this part, for the purpose of operating a hoist at a slope or shaft sinking operation if he has at least 1 year experience operating a hoist plant or maintaining hoist equipment and is qualified by any State as a hoistman or its equivalency, or

(2) If a State has no program for qualifying persons as a hoistman, the Secretary may temporarily qualify

persons for this purpose for periods of time not to exceed 6 months for each temporary certification if the operator of the slope or shaft sinking operation makes an application and a satisfactory showing that each such person has had 1 year experience in the operation of hoists.

(b) Applications for Secretarial qualification should be submitted to the Mine Safety and Health Administration, Certification and Qualification Center, P.O. Box 25367, Denver Federal Center, Denver, Colo. 80225.

[36 FR 9364, May 22, 1971, as amended at 43 FR 12320, Mar. 24, 1978]

§ 77.106 Records of certified and qualified persons.

The operator of each coal mine shall maintain a list of all certified and qualified persons designated to perform duties under this Part 77.

OMB Control No. 1219-0049. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 47 FR 14706, Apr. 6, 1982]

§ 77.107 Training programs.

Every operator of a coal mine shall provide a program, approved by the Secretary, of training and retraining both qualified and certified persons needed to carry out functions prescribed in the Act.

§ 77.107-1 Plans for training programs.

On or before September 30, 1971, each operator shall submit to the District Manager of the Coal Mine Safety and Health District in which the mine is located a program or plan setting forth what, when, how, and where he will train and retain persons whose work assignments require that they be certified or qualified. Such program shall provide: (a) For certified persons, annual training courses in the tasks and duties which they perform as certified persons, first aid, principles of mine rescue, and the provisions of this Part 77; and (b) for qualified persons, annual courses in performance of the tasks which they perform as qualified persons.

[36 FR 9364, May 22, 1971, as amended at 36 FR 13143, July 15, 1971; 44 FR 9380, Feb. 13, 1979; 47 FR 23641, May 28, 1982]

Subpart C—Surface Installations

§ 77.200 Surface installations; general.

All mine structures, enclosures, or other facilities (including custom coal preparation) shall be maintained in good repair to prevent accidents and injuries to employees.

§ 77.201 Methane content in surface installations.

The methane content in the air of any structure, enclosure or other facility shall be less than 1.0 volume per centum.

§ 77.201-1 Tests for methane; qualified person; use of approved device.

Tests for methane in structures, enclosures, or other facilities, in which coal is handled or stored shall be conducted by a qualified person with a device approved by the Secretary at least once during each operating shift, and immediately prior to any repair work in which welding or an open flame is used, or a spark may be produced.

§ 77.201-2 Methane accumulations; change in ventilation.

If, at any time, the air in any structure, enclosure or other facility contains 1.0 volume per centum or more of methane changes or adjustments in the ventilation of such installation shall be made at once so that the air shall contain less than 1.0 volume per centum of methane.

§ 77.202 Dust accumulations in surface installations.

Coal dust in the air of, or in, or on the surfaces of, structures, enclosures, or other facilities shall not be allowed to exist or accumulate in dangerous amounts.

§ 77.203 Use of material or equipment overhead; safeguards.

Where overhead repairs are being made at surface installations and equipment or material is taken into such overhead work areas, adequate protection shall be provided for all persons working or passing below the overhead work areas in which such equipment or material is being used.

§ 77.204 Openings in surface installations; safeguards.

Openings in surface installations through which men or material may fall shall be protected by railings, barriers, covers or other protective devices.

§ 77.205 Travelways at surface installations.

(a) Safe means of access shall be provided and maintained to all working places.

(b) Travelways and platforms or other means of access to areas where persons are required to travel or work, shall be kept clear of all extraneous material and other stumbling or slipping hazards.

(c) Inclined travelways shall be constructed of nonskid material or equipped with cleats.

(d) Regularly used travelways shall be sanded, salted, or cleared of snow and ice as soon as practicable.

(e) Crossovers, elevated walkways, elevated ramps, and stairways shall be of substantial construction, provided with handrails, and maintained in good condition. Where necessary toeboards shall be provided.

(f) Crossovers shall be provided where it is necessary to cross conveyors.

(g) Moving conveyors shall be crossed only at designated crossover points.

§ 77.206 Ladders; construction; installation and maintenance.

(a) Ladders shall be of substantial construction and maintained in good condition.

(b) Wooden members of ladders shall not be painted.

(c) Steep or vertical ladders which are used regularly at fixed locations shall be anchored securely and provided with backguards extending from a point not more than 7 feet from the bottom of the ladder to the top of the ladder.

(d) Fixed ladders shall not incline backwards at any point unless provided with backguards.

(e) Fixed ladders shall be anchored securely and installed to provide at least 3 inches of toe clearance.

(f) Fixed ladders shall project at least 3 feet above landings, or substantial handholds shall be provided above the landings.

§ 77.207 Illumination.

Illumination sufficient to provide safe working conditions shall be provided in and on all surface structures, paths, walkways, stairways, switch panels, loading and dumping sites, and working areas.

§ 77.208 Storage of materials.

(a) Materials shall be stored and stacked in a manner which minimizes stumbling or fall-of-material hazards.

(b) Materials that can create hazards if accidentally liberated from their containers shall be stored in a manner that minimizes the dangers.

(c) Hazardous materials shall be stored in containers of a type approved for such use by recognized agencies; such containers shall be labeled appropriately.

(d) Compressed and liquid gas cylinders shall be secured in a safe manner.

(e) Valves on compressed gas cylinders shall be protected by covers when being transported or stored, and by a safe location when the cylinders are in use.

§ 77.209 Surge and storage piles.

No person shall be permitted to walk or stand immediately above a reclaiming area or in any other area at or near a surge or storage pile where the reclaiming operation may expose him to a hazard.

§ 77.210 Hoisting of materials.

(a) Hitches and slings used to hoist materials shall be suitable for handling the type of materials being hoisted.

(b) Men shall stay clear of hoisted loads.

(c) Taglines shall be attached to hoisted materials that require steadying or guidance.

§ 77.211 Draw-off tunnels; stockpiling and reclaiming operations; general.

(a) Tunnels located below stockpiles, surge piles, and coal storage silos shall be ventilated so as to maintain concentrations of methane below 1.0 volume per centum.

(b) In addition to the tests for methane required by § 77.201 such tests shall also be made before any electric equipment is energized or repaired, unless equipped with a continuous methane monitoring device installed and operated in accordance with the provisions of § 77.211-1. Electric equipment shall not be energized, operated, or repaired until the air contains less than 1.0 volume per centum of methane.

§ 77.211-1 Continuous methane monitoring device; installation and operation; automatic deenergization of electric equipment.

Continuous methane monitoring devices shall be set to deenergize automatically electric equipment when such monitor is not operating properly and to give a warning automatically when the concentration of methane reaches a maximum percentage determined by an authorized representative of the Secretary which shall not be more than 1.0 volume per centum of methane. An authorized representative of the Secretary shall require such monitor to deenergize automatically electric equipment when the concentration of methane reaches a maximum percentage determined by such representative which shall not be more than 2.0 volume per centum of methane.

§ 77.212 Draw-off tunnel ventilation fans; installation.

When fans are used to ventilate draw-off tunnels the fans shall be:

(a) Installed on the surface;

(b) Installed in fireproof housings and connected to the tunnel openings with fireproof air ducts; and,

(c) Offset from the tunnel opening.

§ 77.213 Draw-off tunnel escapeways.

When it is necessary for a tunnel to be closed at one end, an escapeway not less than 30 inches in diameter (or of the equivalent, if the escapeway does not have a circular cross section) shall be installed which extends from the closed end of the tunnel to a safe location on the surface; and, if the escapeway is inclined more than 30 degrees from the horizontal it shall be equipped with a ladder which runs the full length of the inclined portion of the escapeway.

§ 77.214 Refuse piles; general.

(a) Refuse piles constructed on or after July 1, 1971, shall be located in areas which are a safe distance from all underground mine airshafts, preparation plants, tipples, or other surface installations and such piles shall not be located over abandoned openings or steamlines.

(b) Where new refuse piles are constructed over exposed coal beds the exposed coal shall be covered with clay or other inert material as the piles are constructed.

(c) A fireproof barrier of clay or inert material shall be constructed between old and new refuse piles.

(d) Roadways to refuse piles shall be fenced or otherwise guarded to restrict the entrance of unauthorized persons.

[36 FR 9364, May 22, 1971, as amended at 36 FR 13143, July 15, 1971]

§ 77.215 Refuse piles; construction requirements.

(a) Refuse deposited on a pile shall be spread in layers and compacted in such a manner so as to minimize the flow of air through the pile.

(b) Refuse shall not be deposited on a burning pile except for the purpose of controlling or extinguishing a fire.

(c) Clay or other sealants shall be used to seal the surface of any refuse pile in which a spontaneous ignition has occurred.

(d) Surface seals shall be kept intact and protected from erosion by drainage facilities.

(e) Refuse piles shall not be constructed so as to impede drainage or impound water.

(f) Refuse piles shall be constructed in such a manner as to prevent accidental sliding and shifting of materials.

(g) No extraneous combustible material shall be deposited on refuse piles.

(h) After October 31, 1975 new refuse piles and additions to existing refuse piles, shall be constructed in compacted layers not exceeding 2 feet in thickness and shall not have any slope exceeding 2 horizontal to 1 vertical (approximately 27°) except that the District Manager may approve construction of a refuse pile in compacted layers exceeding 2 feet in thickness and with slopes exceeding 27° where engineering data substantiates that a minimum safety factor of 1.5 for the refuse pile will be attained.

(i) Foundations for new refuse piles and additions to existing refuse piles shall be cleared of all vegetation and undesirable material that according to current, prudent engineering practices would adversely affect the stability of the refuse pile.

(j) All fires in refuse piles shall be extinguished, and the method used shall be in accordance with a plan approved by the District Manager. The plan shall contain as a minimum, provisions to ensure that only those persons authorized by the operator, and who have an understanding of the procedure to be used, shall be involved in the extinguishing operation.

OMB CONTROL No. 1219-0074, paragraph (j). (47 FR 14696, Apr. 6, 1982)

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957), Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 40 FR 41776, Sept. 9, 1975; 47 FR 14696, Apr. 6, 1982]

§ 77.215-1 Refuse piles; identification.

A permanent identification marker, at least six feet high and showing the refuse pile identification number as assigned by the District Manager, the name associated with the refuse pile and the name of the person owning, operating or controlling the refuse pile, shall be located on or immediately adjacent to each refuse pile within the time specified in paragraphs (a) or (b) of this section as applicable.

(a) For existing refuse piles, markers shall be placed before May 1, 1976.

(b) For new or proposed refuse piles, markers shall be placed within 30 days from acknowledgment of the proposed location of a new refuse pile.

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957))

[40 FR 41776, Sept. 9, 1975]

§ 77.215-2 Refuse piles; reporting requirements.

(a) The proposed location of a new refuse pile shall be reported to and acknowledged in writing by the District Manager prior to the beginning of any work associated with the construction of the refuse pile.

(b) Before May 1, 1976, for existing refuse piles, or within 180 days from the date of acknowledgment of the proposed location of a new refuse pile, the person owning, operating or controlling a refuse pile shall submit to the District Manager a report in triplicate which contains the following:

(1) The name and address of the person owning, operating or controlling the refuse pile; the name associated with the refuse pile; the identification number of the refuse pile as assigned by the District Manager; and the identification number of the mine or preparation plant as assigned by MSHA.

(2) The location of the refuse pile indicated on the most recent USGS 7½ minute or 15 minute topographic quadrangle map, or a topographic map of equivalent scale if a USGS map is not available.

(3) A statement of the construction history of the refuse pile, and a statement indicating whether the refuse pile has been abandoned in accordance with a plan approved by the District Manager.

(4) A topographic map showing at a scale not to exceed 1 inch = 400 feet, the present and proposed maximum extent of the refuse pile and the area 500 feet around the proposed maximum perimeter.

(5) A statement of whether or not the refuse pile is burning.

(6) A description of measures taken to prevent water from being impounded by the refuse pile or contained within the refuse pile.

(7) At a scale not to exceed 1 inch = 100 feet, cross sections of the length and width of the refuse pile at sufficient intervals to show the approximate original ground surface, the present configuration and the pro-

posed maximum extent of the refuse pile, and mean sea level elevations at significant points.

(8) Any other information pertaining to the stability of the pile which may be required by the District Manager.

(c) The information required by paragraphs (b)(4) through (b)(8) of this section shall be reported every twelfth month from the date of original submission for those refuse piles which the District Manager has determined can present a hazard and which have not been abandoned in accordance with a plan approved by the District Manager.

OMB Control No. 1219-0015 and 1219-0060. (47 FR 14696, Apr. 6, 1982)

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957), Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[40 FR 41776, Sept. 9, 1975, as amended at 47 FR 14696, Apr. 6, 1982]

§ 77.215-3 Refuse piles: certification.

(a) Within 180 days following written notification by the District Manager that a refuse pile can present a hazard, the person owning, operating, or controlling the refuse pile shall submit to the District Manager a certification by a registered engineer that the refuse pile is constructed or has been modified in accordance with current, prudent engineering practices to minimize the probability of impounding water and failure of such magnitude as to endanger the lives of miners.

(b) After the initial certification required by this section, certifications shall be submitted every twelfth month from the date of the initial certification for all refuse piles which have not been abandoned in accordance with a plan approved by the District Manager.

(c) Certifications required by paragraphs (a) and (b) of this section shall include all information considered in making the certification.

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957))

[40 FR 41776, Sept. 9, 1975]

§ 77.215-4 Refuse piles; abandonment.

When a refuse pile is to be abandoned, the District Manager shall be notified in writing, and if he determines it can present a hazard, the refuse pile shall be abandoned in accordance with a plan submitted by the operator and approved by the District Manager. The plan shall include a schedule for its implementation and describe provisions to prevent burning and future impoundment of water, and provide for major slope stability.

OMB Control No. 1219-0074. (47 FR 14696, Apr. 6, 1982)

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957), Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[40 FR 41776, Sept. 9, 1975, as amended at 47 FR 14696, Apr. 6, 1982]

§ 77.216 Water, sediment, or slurry impoundments and impounding structures; general.

(a) Plans for the design, construction, and maintenance of structures which impound water, sediment, or slurry shall be required if such an existing or proposed impounding structure can:

(1) Impound water, sediment, or slurry to an elevation of five feet or more above the upstream toe of the structure and can have a storage volume of 20 acre-feet or more; or

(2) Impound water, sediment, or slurry to an elevation of 20 feet or more above the upstream toe of the structure; or

(3) As determined by the District Manager, present a hazard to coal miners.

(b) Plans for the design and construction of all new water, sediment, or slurry impoundments and impounding structures which meet the requirements of paragraph (a) of this section shall be submitted in triplicate to and be approved by the District Manager prior to the beginning of any work associated with construction of the impounding structure.

(c) Before May 1, 1976, a plan for the continued use of an existing water, sediment, or slurry impoundment and impounding structure which meets the requirements of paragraph (a) of this section shall be submitted in triplicate to the District Manager for approval.

(d) The design, construction, and maintenance of all water, sediment, or slurry impoundments and impounding structures which meet the requirements of paragraph (a) of this section shall be implemented in accordance with the plan approved by the District Manager.

(e) All fires in impounding structures shall be extinguished, and the method used shall be in accordance with a plan approved by the District Manager. The plan shall contain as a minimum, provisions to ensure that only those persons authorized by the operator, and who have an understanding of the procedures to be used, shall be involved in the extinguishing operation.

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957))

[40 FR 41776, Sept. 9, 1975]

§ 77.216-1 Water, sediment or slurry impoundments and impounding structures; identification.

A permanent identification marker, at least six feet high and showing the identification number of the impounding structure as assigned by the District Manager, the name associated with the impounding structure and name of the person owning, operating, or controlling the structure, shall be located on or immediately adjacent to each water, sediment or slurry impounding structure within the time specified in paragraphs (a) or (b) of this section as applicable.

(a) For existing water, sediment or slurry impounding structures, markers shall be placed before May 1, 1976.

(b) For new or proposed water, sediment, or slurry impounding structures, markers shall be placed within 30 days from the start of construction.

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957))

[40 FR 41777, Sept. 9, 1975]

§ 77.216-2 Water, sediment, or slurry impoundments and impounding structures; minimum plan requirements; changes or modifications; certification.

(a) The plan specified in § 77.216, shall contain as a minimum the following information:

(1) The name and address of the persons owning, operating or controlling the impoundment or impounding structure; the name associated with the impoundment or impounding structure; the identification number of the impounding structure as assigned by the District Manager; and the identification number of the mine or preparation plant as assigned by MSHA.

(2) The location of the structure indicated on the most recent USGS 7½ minute or 15 minute topographic quadrangle map, or a topographic map of equivalent scale if a USGS map is not available.

(3) A statement of the purpose for which the structure is or will be used.

(4) The name and size in acres of the watershed affecting the impoundment.

(5) A description of the physical and engineering properties of the foundation materials on which the structure is or will be constructed.

(6) A statement of the type, size, range, and physical and engineering properties of the materials used, or to be used, in constructing each zone or stage of the impounding structure; the method of site preparation and construction of each zone; the approximate dates of construction of the structure and each successive stage; and for existing structures, such history of construction as may be available, and any record or knowledge of structural instability.

(7) At a scale not to exceed 1 inch=100 feet, detailed dimensional drawings of the impounding structure including a plan view and cross sections of the length and width of the impounding structure, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection, in addition to the measurement of the minimum vertical distance between the crest of the impounding structure and the reservoir surface at present and under

design storm conditions, sediment or slurry level, water level and other information pertinent to the impoundment itself, including any identifiable natural or manmade features which could affect operation of the impoundment.

(8) A description of the type and purpose of existing or proposed instrumentation.

(9) Graphs showing area-capacity curves.

(10) A statement of the runoff attributable to the probable maximum precipitation of 6-hour duration and the calculations used in determining such runoff.

(11) A statement of the runoff attributable to the storm for which the structure is designed and the calculations used in determining such runoff.

(12) A description of the spillway and diversion design features and capacities and calculations used in their determination.

(13) The computed minimum factor of safety range for the slope stability of the impounding structure including methods and calculations used to determine each factor of safety.

(14) The locations of surface and underground coal mine workings including the depth and extent of such workings within the area 500 feet around the perimeter, shown at a scale not to exceed one inch=500 feet.

(15) Provisions for construction surveillance, maintenance, and repair of the impounding structure.

(16) General provisions for abandonment.

(17) A certification by a registered engineer that the design of the impounding structure is in accordance with current, prudent engineering practices for the maximum volume of water, sediment, or slurry which can be impounded therein and for the passage of runoff from the designed storm which exceeds the capacity of the impoundment; or, in lieu of the certification, a report indicating what additional investigations, analyses, or improvement work are necessary before such a certification can be made, including what provisions have been made to carry out such work in addition to a schedule for completion of such work.

(18) Such other information pertaining to the stability of the impoundment and impounding structure which may be required by the District Manager.

(b) Any changes or modifications to plans for water, sediment, or slurry impoundments or impounding structures shall be approved by the District Manager prior to the initiation of such changes or modifications.

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957))

[40 FR 41777, Sept. 9, 1975]

§ 77.216-3 Water, sediment, or slurry impoundments and impounding structures; inspection requirements; correction of hazards; program requirements.

(a) All water, sediment, or slurry impoundments which meet the requirements of § 77.216(a) shall be examined by a qualified person designated by the person owning, operating or controlling the impounding structure at intervals not exceeding seven days for appearances of structural weakness and other hazardous conditions. All instruments shall be monitored at intervals not exceeding seven days by a qualified person designated by the person owning, operating, or controlling the impounding structure.

(b) When a potentially hazardous condition develops, the person owning, operating or controlling the impounding structure shall immediately:

(1) Take action to eliminate the potentially hazardous condition;

(2) Notify the District Manager;

(3) Notify and prepare to evacuate, if necessary, all coal miners from coal mine property which may be affected by the potentially hazardous conditions; and

(4) Direct a qualified person to monitor all instruments and examine the structure at least once every eight hours, or more often as required by an authorized representative of the Secretary.

(c) After each examination and instrumentation monitoring referred to in paragraphs (a) and (b) of this section, each qualified person who conducted all or any part of the examination or instrumentation monitoring shall promptly record the results of such examination or instrumentation monitoring in a book which shall be available at the mine for inspection by an authorized representative of the Secretary, and such qualified person shall also promptly report the results of the examination or monitoring to one of the persons specified in paragraph (d) of this section.

(d) All examination and instrumentation monitoring reports recorded in accordance with paragraph (c) of this section shall include a report of the action taken to abate hazardous conditions and shall be promptly signed or countersigned by at least one of the following persons:

(1) The mine foreman;

(2) The assistant superintendent of the mine;

(3) The superintendent of the mine;

(4) The person designated by the operator as responsible for health and safety at the mine.

(e) Before May 1, 1976, the person owning, operating, or controlling a water, sediment, or slurry impoundment which meets the requirements of § 77.216(a) shall adopt a program for carrying out the requirements of paragraphs (a) and (b) of this section. The program shall be submitted for approval to the District Manager. The program shall include as a minimum:

(1) A schedule and procedures for examining the impoundment and impounding structure by a designated qualified person;

(2) A schedule and procedures for monitoring any required or approved instrumentation by a designated qualified person;

(3) Procedures for evaluating hazardous conditions;

(4) Procedures for eliminating hazardous conditions;

(5) Procedures for notifying the District Manager;

(6) Procedures for evacuating coal miners from coal mine property which may be affected by the hazardous condition.

(f) Before making any changes or modifications in the program approved in accordance with paragraph (e) of this section, the person owning, operating, or controlling the impoundment shall obtain approval of such changes or modifications from the District Manager.

(g) The qualified person or persons referred to in paragraphs (a), (b)(4), (c), (e)(1), and (e)(2) of this section shall be trained to recognize specific signs of structural instability and other hazardous conditions by visual observation and, if applicable, to monitor instrumentation.

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957))

[40 FR 41777, Sept. 9, 1975]

§ 77.216-4 Water, sediment or slurry impoundments and impounding structures; reporting requirements; certification.

Every twelfth month following the submission of information specified in § 77.216-2(a) the person owning, operating, or controlling a water, sediment, or slurry impoundment and impounding structure that has not been abandoned in accordance with an approved plan, shall submit to the District Manager a report describing any changes in the geometry of the impounding structure; instrumentation; average and maximum depths and elevations of the impounded water, sediment, or slurry; storage capacity of the impounding structure; the volume of water, sediment, or slurry impounded; and any other aspect of the impounding structure affecting its stability which has occurred during such reporting period. The report shall also contain a certification by a registered engineer that all work was performed in accordance with the approved plan.

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957))

[40 FR 41778, Sept. 9, 1975]

§ 77.216-5 Water, sediment or slurry impoundments and impounding structures; abandonment.

Prior to abandonment of any water, sediment, or slurry impoundment and impounding structure which meets the requirements of § 77.216(a), the person owning, operating, or controlling such an impoundment and impounding structure shall submit to and obtain approval of the District Manager a plan for abandonment based on current, prudent engineering practices which shall contain provisions to preclude the probability of future impoundment of water, sediment, or slurry, provide for major slope stability, and include a schedule for the plan's implementation.

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957))

[40 FR 41778, Sept. 9, 1975]

§ 77.217 Definitions.

For the purpose of §§ 77.214 through 77.216-5, the term:

(a) "Abandoned" as applied to any refuse pile or impoundment and impounding structure means that work on such pile or structure has been completed in accordance with a plan for abandonment approved by the District Manager.

(b) "Area-capacity curves" means graphic curves which readily show the reservoir water surface area, in acres, at different elevations from the bottom of the reservoir to the maximum water surface, and the capacity or volume, in acre-feet, of the water contained in the reservoir at various elevations.

(c) "Impounding structure" means a structure which is used to impound water, sediment, or slurry, or any combination of such materials.

(d) "Probable maximum precipitation" means the value for a particular area which represents an envelopment of depth-duration-area rainfall relations for all storm types affecting that area adjusted meteorologically to maximum conditions.

(e) "Refuse pile" means a deposit of coal mine waste which may contain a mixture of coal, shale, claystone, siltstone, sandstone, limestone, and related materials that are excavated during mining operations or separated from mined coal and disposed of on the surface as waste byproducts of either coal mining or preparation operations. "Refuse pile" does not mean temporary spoil piles of removed overburden material associated with surface mining operations.

(f) "Safety factor" means the ratio of the forces tending to resist the failure of a structure to the forces tending to cause such failure as determined by accepted engineering practice.

(Secs. 101, 508, Pub. L. 91-173, 83 Stat. 745, 803 (30 U.S.C. 811, 957))

[40 FR 41778, Sept. 9, 1975]

Subpart D—Thermal Dryers

§ 77.300 Thermal dryers; general.

On and after July 1, 1971 dryer systems used for drying coal at high temperatures, hereinafter referred to as thermal dryers, including rotary dryers, continuous carrier dyes, vertical tray, and cascade dryers, multilouver dryers, suspension or flash dryers, and fluidized bed dryers, shall be maintained and operated in accordance with the provision of § 77.301 to § 77.306.

[36 FR 9364, May 22, 1971, as amended at 36 FR 13143, July 15, 1971]

§ 77.301 Dryer heating units; operation.

(a) Dryer heating units shall be operated to provide reasonably complete combustion before heated gases are allowed to enter hot gas inlets.

(b) Dryer heating units which are fired by pulverized coal, shall be operated and maintained in accordance with the recommended standards set forth in the National Fire Protection Association Handbook, 12th Edition, Section 9, "Installation of Pulverized Fuel Systems," 1962.

§ 77.302 Bypass stacks.

Thermal dryer systems shall include a bypass stack, relief stack or individual discharge stack provided with automatic venting which will permit gases from the dryer heating unit to bypass the heating chamber and vent to the outside atmosphere during any shutdown operation.

§ 77.303 Hot gas inlet chamber dropout doors.

Thermal dryer systems which employ a hot gas inlet chamber shall be equipped with drop-out doors at the bottom of the inlet chamber or with other effective means which permit coal, fly-ash, or other heated material to fall from the chamber.

§ 77.304 Explosion release vents.

Drying chambers, dry-dust collectors, ductwork connecting dryers to dust collectors, and ductwork between dust collectors and discharge stacks shall be protected with explosion release vents which open directly to the outside atmosphere, and all such vents shall be:

(a) Hinged to prevent dislodgment;

(b) Designed and constructed to permit checking and testing by manual operation; and

(c) Equal in size to the cross-sectional area of the collector vortex finder when used to vent dry dust collectors.

§ 77.305 Access to drying chambers, hot gas inlet chambers and ductwork; installation and maintenance.

Drying chambers, hot gas inlet chambers and all ductwork in which coal dust may accumulate shall be equipped with tight sealing access doors which shall remain latched during dryer operation to prevent the emission of coal dust and the loss of fluidizing air.

§ 77.306 Fire protection.

Based on the need for fire protection measures in connection with the particular design of the thermal dryer, an authorized representative of the Secretary may require any of the following measures to be employed:

(a) Water sprays automatically actuated by rises in temperature to prevent fire, installed inside the thermal dryer systems, and such sprays shall be designed to provide for manual operation in the event of power failure.

(b) Fog nozzles, or other no less effective means, installed inside the thermal dryer systems to provide additional moisture or an artificial drying load within the drying system when the system is being started or shutdown.

(c) The water system of each thermal dryer shall be interconnected to a supply of compressed air which permits constant or frequent purging of all water sprays and fog nozzles or other no less effective means of purging shall be provided.

§ 77.307 Thermal dryers; location and installation; general.

(a) Thermal dryer systems erected or installed at any coal mine after June 30, 1971 shall be located at least 100 feet from any underground coal mine opening, and 100 feet from any surface installation where the heat, sparks, flames, or coal dust from the system might cause a fire or explosion.

(b) Thermal dryer systems erected or installed after June 30, 1971 may be covered by roofs, however, such systems shall not be otherwise enclosed unless necessary to protect the health and safety of persons employed at the mine. Where such systems are enclosed, they shall be located in separate fireproof structures of heavy construction with explosion pressure release devices (such as hinged wall panels, window sashes, or louvers); which provide at least 1 square foot of area for each 80 cubic feet of space volume and which are distributed as uniformly as possible throughout the structure.

§ 77.308 Structures housing other facilities; use of partitions.

Thermal dryer systems installed after June 30, 1971 in any structure which also houses a tipple, cleaning plant, or other operating facility shall be separated from all other working areas of such structure by a substantial partition capable of providing greater resistance to explosion pressures than the exterior wall or walls of the structure. The partition shall also include substantial, self-closing fire doors at all entrances to the areas adjoining the dryer system.

§ 77.309 Visual check of system equipment.

Frequent visual checks shall be made by the operator of the thermal dryer system control station, or by some other competent person, of the bypass dampers, air-tempering louvers, discharge mechanism, and other dryer system equipment.

§ 77.309-1 Control stations; location.

Thermal dryer system control stations constructed after June 30, 1971, shall be installed at a location which will give to the operator of the control station the widest field of visibility of the system and equipment.

§ 77.310 Control panels.

(a) All thermal dryer system control panels constructed after June 30, 1971 shall be located in an area which is relatively free of moisture and dust and shall be installed in such a manner as to minimize vibration.

(b) A schematic diagram containing legends which show the location of each thermocouple, pressure tap, or other control or gaging instrument in the drying system shall be posted on or near the control panel of each thermal drying system.

(c) Each instrument on the control panel shall be identified by a nameplate or equivalent marking.

(d) A plan to control the operation of each thermal dryer system shall be posted at or near the control panel showing a sequence of startup, normal shutdown, and emergency shutdown procedures.

§ 77.311 Alarm devices.

Thermal dryer systems shall be equipped with both audible and visual alarm devices which are set to operate when safe dryer temperatures are exceeded.

§ 77.312 Fail safe monitoring systems.

Thermal dryer systems and controls shall be protected by a fail safe monitoring system which will safely shut down the system and any related equipment upon failure of any component in the dryer system.

§ 77.313 Wet-coal feedbins; low-level indicators.

Wet-coal bins feeding thermal drying systems shall be equipped with both audible and visual low-coal-level indicators.

§ 77.314 Automatic temperature control instruments.

(a) Automatic temperature control instruments for thermal dryer system shall be of the recording type.

(b) Automatic temperature control instruments shall be locked or sealed to prevent tampering or unauthorized adjustment. These instruments shall not be set above the maximum allowable operating temperature.

(c) All dryer control instruments shall be inspected and calibrated at least once every 3 months and a record or certificate of accuracy, signed by a trained employee or by a servicing agent, shall be kept at the plant.

§ 77.315 Thermal dryers; examination and inspection.

Thermal dryer systems shall be examined for fires and coal-dust accumulations if the dryers are not restarted promptly after a shutdown.

Subpart E—Safeguards for Mechanical Equipment

§ 77.400 Mechanical equipment guards.

(a) Gears; sprockets; chains; drive, head, tail, and takeup pulleys; flywheels; couplings; shafts; sawblades; fan inlets; and similar exposed moving machine parts which may be contacted by persons, and which may cause injury to persons shall be guarded.

(b) Overhead belts shall be guarded if the whipping action from a broken line would be hazardous to persons below.

(c) Guards at conveyor-drive, conveyor-head, and conveyor-tail pulleys shall extend a distance sufficient to prevent a person from reaching behind the guard and becoming caught between the belt and the pulley.

(d) Except when testing the machinery, guards shall be securely in place while machinery is being operated.

§ 77.401 Stationary grinding machines; protective devices.

(a) Stationary grinding machines other than special bit grinders shall be equipped with:

(1) Peripheral hoods (less than 90° throat openings) capable of withstanding the force of a bursting wheel.

(2) Adjustable tool rests set as close as practical to the wheel.

(3) Safety washers.

(b) Grinding wheels shall be operated within the specifications of the manufacturer of the wheel.

(c) Face shields or goggles, in good condition, shall be worn when operating a grinding wheel.

§ 77.402 Hand-held power tools; safety devices.

Hand-held power tools shall be equipped with controls requiring constant hand or finger pressure to operate the tools or shall be equipped with friction or other equivalent safety devices.

§ 77.403 Mobile equipment; falling object protective structures (FOPS).

(a) When necessary to protect the operator of the equipment, all rubber-tired or crawler-mounted self-propelled scrapers, front-end loaders, dozers, graders, loaders, and tractors, with or without attachments, that are used in surface coal mines or the surface work areas of underground coal mines shall be provided with substantial falling object protective structures (FOPS). FOPS which meet the requirements of the Society of Automotive Engineers (SAE) Standard J 231 shall be considered to be a "substantial" FOPS. An authorized representative of the Secretary may approve a FOPS which provides protection equivalent to SAE J 231.

(b) When necessary to protect the operator of the equipment, forklift or powered industrial trucks shall be provided with substantial FOPS. Such FOPS shall meet the requirements of the State of California, Division of Industrial Safety, General Safety Orders, Register 72, Number 6, February 8, 1972, Article 25, Section 3655—"Overhead Guards for High-Lift Rider Trucks."

(Sec. 101(a) of the Federal Coal Mine Health and Safety Act of 1969, as amended (83 Stat. 745; 30 U.S.C. 811(a))

[39 FR 24007, June 28, 1974]

§ 77.403a Mobile equipment; rollover protective structures (ROPS).

(a) All rubber-tired or crawler-mounted self-propelled scrapers, front-end loaders, dozers, graders, loaders, and tractors, with or without attachments, that are used in surface coal mines or the surface work areas of underground coal mines shall be provided with rollover protective structures (hereinafter referred to as ROPS) in accordance with the requirements of paragraphs (b) through (f) of this section, as applicable.

(b) *Mobile equipment manufactured on and after September 1, 1974.* All mobile equipment described in paragraph (a) of this section manufactured on and after September 1, 1974 shall be equipped with ROPS meeting the requirements of the Department of Labor specified in §§ 1926.1001 and 1926.1002 of Part 1926, Title 29, Code of Federal Regulations—Safety and Health Regulations for Construction.

(c) *Mobile equipment manufactured prior to September 1, 1974.* All mobile equipment described in paragraph (a) of this section manufactured prior to September 1, 1974 shall be equipped with ROPS meeting the requirements of paragraphs (d) through (f) of this section, as appropriate, no later than the dates specified in paragraphs (1), (2), and (3) of this paragraph (c), unless an earlier date is required by an authorized representative of the Secretary under paragraph (c)(4) of this section:

(1) Mobile equipment manufactured between July 1, 1971, and September 1, 1974, shall be equipped with ROPS no later than March 1, 1975.

(2) Mobile equipment manufactured between July 1, 1970, and June 30, 1971, shall be equipped with ROPS no later than July 1, 1975.

(3) Mobile equipment manufactured between July 1, 1969, and June 30, 1970, shall be equipped with ROPS no later than January 1, 1976.

(4) Irrespective of the time periods specified in paragraph (c) (1) through (3) of this section an authorized representative of the Secretary may require such mobile equipment to be equipped with ROPS at an earlier date when necessary to protect the operator of the equipment under the conditions in which the mobile equipment is, or will be operated. The authorized representative of the Secretary shall in writing advise the operator that the equipment shall be equipped with a ROPS and shall fix a time within which the operator shall provide and install the ROPS. If such ROPS is not provided and installed within the time fixed a notice shall be issued to the op-

erator pursuant to section 104 of the Act.

(5) Nothing in this § 77.403a shall preclude the issuance of a withdrawal order because of imminent danger.

(d) Except as provided in paragraph (e) of this section, mobile equipment described in paragraph (a) of this section, manufactured prior to September 1, 1974, shall be deemed in compliance with this section if the ROPS is installed in accordance with the recommendations of the ROPS manufacturer or designer. The coal mine operator shall exhibit certification from the ROPS manufacturer or designer in the form of a label attached to the equipment, indicating the manufacturer's or fabricator's name and address, the ROPS model number, if any, the machine make, model or series number that the structure is designed to fit, and compliance with the applicable specification listed in paragraph (c)(1) or (2) of this section, or he shall, upon request of the authorized representative of the Secretary, furnish certification from a registered professional engineer that:

(1) The ROPS complies with the Society of Automotive Engineers (SAE) Standard J 397, "Critical Zone—Characteristics and Dimensions for Operators of Construction and Industrial Machinery" or SAE J 397a, "Deflection Limiting Volume for Laboratory Evaluation of Rollover Protective Structures (ROPS) and Falling Object Protective Structures (FOPS) of Construction and Industrial Vehicles" and the following applicable SAE Standards:

(i) J 320a, "Minimum Performance Criteria for Rollover Protective Structure for Rubber-Tired Self-Propelled Scrapers" or J 320b, "Minimum Performance Criteria for Rollover Protective Structures for Prime Movers"; or

(ii) J 394, "Minimum Performance Criteria for Rollover Protective Structure for Rubber-Tired Front-End Loaders and Rubber-Tired Dozers" or J 394a, "Minimum Performance Criteria for Rollover Protective Structures for Wheeled Front-End Loaders and Wheeled Dozers"; or

(iii) J 395, "Minimum Performance Criteria for Rollover Protective Structure for Crawler Tractors and Crawler-Type Loaders" or J 395a, "Minimum Performance Criteria for Rollover Protective Structures for Track-Type Tractors and Track-Type Front-End Loaders"; or

(iv) J 396 or J 396a, "Minimum Performance Criteria for Rollover Protective Structures for Motor Graders"; or

(v) J 167, "Protective Frame with Overhead Protection—Test Procedures and Performance Requirements"; or

(vi) J 334a, "Protective Frame Test Procedures and Performance Requirements"; or

(2) The ROPS and supporting attachments will:

(i) Show satisfactory performance by actual test of a prototype involving a roll of 720° or more; or

(ii) Support not less than the weight of the vehicle applied as a uniformly distributed horizontal load at the top of the structure and perpendicular to a vertical plane through the longitudinal axis of the prime mover, and support two times the weight of the vehicle applied as a uniformly distributed vertical load to the top of the structure;[1] or

(iii) Support the following separately applied minimum loads:

(A) 125 percent of the weight of the vehicle applied as a uniformly distributed horizontal load at the top of the ROPS and perpendicular to a critical plane through the longitudinal axis of the prime mover; and

(B) A load of twice the weight of the vehicle applied as a uniformly distributed vertical load to the top of the ROPS after complying with paragraph (d) (1) (iii) (A) of this section. Stresses shall not exceed the ultimate strength. Steel used in the ROPS must have capability to perform at 0° F., or exhibit Charpy V-notch impact strength at 8 ft.-lb. at −20° F. with a standard Charpy V-notch Type A specimen and provide 20 percent elongation over two inches in a standard two inch gauge length on a 0.505 inch diameter tensile specimen. Bolts and nuts shall be SAE grade 8 (reference SAE J 429d, J 429e, J 429f or J 429g and J 995, J 995a or J 995b).

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[1] Paragraph (d) or § 77.403a is based on the ROPS criteria of the U.S. Army Corps of Engineers, Safety—General Safety Requirements EM 385-1-1, Change 1, No. 21, Para. 18.A.20 (March 27, 1972), except that subparagraph (2)(ii) of this paragraph (d) is substituted for Para. 18.A.20e(2) of the Corps requirements.

(e) *Mobile equipment manufactured prior to September 1, 1974 meeting certain existing governmental requirements for ROPS.* Mobile equipment described in paragraph (a) of this section, manufactured prior to September 1, 1974 and already equipped with ROPS, shall be deemed in compliance with this section if it meets the ROPS requirements of the State of California, the U.S. Army Corps of Engineers, the Bureau of Reclamation of the U.S. Department of the Interior in effect on April 5, 1972, or the Occupational Safety and Health Administration, U.S. Department of Labor. The requirements in effect are:

(1) State of California: Construction Safety Orders 1591(i), 1596, and Logging and Sawmill Safety Order 5243, issued by the Department of Industrial Relations pursuant to Division 5, Labor Code § 6312, State of California;

(2) U.S. Army Corps of Engineers: Safety—General Safety Requirements, EM-385-1-1 (March 1967);

(3) Bureau of Reclamation, U.S. Department of the Interior: Safety and Health Regulations for Construction, Part II (September 1971); and

(4) Occupational Safety and Health Administration, U.S. Department of Labor: Safety and Health Regulations for Construction, 29 C.FR 1926.1001 and 1926.1002.

(f) Field welding on ROPS shall be performed by welders who are certified by the coal mine operator or equipment distributor as being qualified in accordance with the American Welding Society Structural Welding Code AWS D1.1-73, or Military Standard MIL-STD 248, or the equivalent thereof.

(g) Seat belts required by § 77.1710(i) shall be worn by the operator of mobile equipment required to be equipped with ROPS by § 77.403a.

(Sec. 101(a) of the Federal Coal Mine Health and Safety Act of 1969, as amended (83 Stat. 745; 30 U.S.C. 811(a))

[39 FR 24007, June 28, 1974]

§ 77.403b Incorporation by reference.

In accordance with 5 U.S.C. 552(a), the publications to which references are made in §§ 77.403 and 77.403a and which have been prepared by organizations other than the Mine Safety and Health Administration (MSHA), are hereby incorporated by reference and made a part hereof. The incorporated publications are available at each Coal Mine Health and Safety District and Subdistrict Office of MSHA. The U.S. Army Corps of Engineers, Safety—General Safety Requirements and the Occupational Safety and Health Administration regulations are also available from the U.S. Government Printing Office, Washington, D.C. 20402. Bureau of Reclamation Safety and Health Regulations for Construction are available from the Bureau of Reclamation, Division of Safety, Engineering and Research Center, Denver, Colorado. SAE documents are available from the Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, N.Y. 10001. American Welding Society Structural Welding Code D1.1-73 is available from the American Welding Society, Inc., 2501 NW 7th Street, Miami, Florida 33125. Military Standard MIL-STD 248 is available from the U.S. Government Printing Office, Washington, D.C. 20202.

(Sec. 101(a) of the Federal Coal Mine Health and Safety Act of 1969, as amended (83 Stat. 745; 30 U.S.C. 811(a))

[39 FR 24008, June 28, 1974]

§ 77.404 Machinery and equipment; operation and maintenance.

(a) Mobile and stationary machinery and equipment shall be maintained in safe operating condition and machinery or equipment in unsafe condition shall be removed from service immediately.

(b) Machinery and equipment shall be operated only by persons trained in the use of and authorized to operate such machinery or equipment.

(c) Repairs or maintenance shall not be performed on machinery until the power is off and the machinery is blocked against motion, except where machinery motion is necessary to make adjustments.

(d) Machinery shall not be lubricated while in motion where a hazard exists, unless equipped with extended fittings or cups.

§ 77.405 Performing work from a raised position; safeguards.

(a) Men shall not work on or from a piece of mobile equipment in a raised position until it has been blocked in place securely. This does not preclude the use of equipment specifically designed as elevated mobile work platforms.

(b) No work shall be performed under machinery or equipment that has been raised until such machinery or equipment has been securely blocked in position.

§ 77.406 Drive belts.

(a) Drive belts shall not be shifted while in motion unless the machines are provided with mechanical shifters.

(b) Belt dressing shall not be applied while belts are in motion except where it can be applied without endangering a person.

§ 77.407 Power-driven pulleys.

(a) Belts, chains, and ropes shall not be guided onto power-driven moving pulleys, sprockets, or drums with the hands except on slow moving equipment especially designed for hand feeding.

(b) Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

§ 77.408 Welding operations.

Welding operations shall be shielded and the area shall be well-ventilated.

§ 77.409 Shovels, draglines, and tractors.

(a) Shovels, draglines, and tractors shall not be operated in the presence of any person exposed to a hazard from its operation and all such equipment shall be provided with an adequate warning device which shall be sounded by the operator prior to starting operation.

(b) Shovels and draglines shall be equipped with handrails along and around all walkways and platforms.

§ 77.410 Mobile equipment; automatic warning devices.

Mobile equipment, such as trucks, forklifts, front-end loaders, tractors and graders, shall be equipped with an adequate automatic warning device which shall give an audible alarm when such equipment is put in reverse.

§ 77.411 Compressed air and boilers; general.

All boilers and pressure vessels shall be constructed, installed, and maintained in accordance with the standards and specifications of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.

§ 77.412 Compressed air systems.

(a) Compressors and compressed-air receivers shall be equipped with automatic pressure-relief valves, pressure gages, and drain valves.

(b) Repairs involving the pressure system of compressors, receivers, or compressed-air-powered equipment shall not be attempted until the pressure has been relieved from that part of the system to be repaired.

(c) At no time shall compressed air be directed toward a person. When compressed air is used, all necessary precautions shall be taken to protect persons from injury.

(d) Safety chains or suitable locking devices shall be used at connections to machines of high-pressure hose lines of 1-inch inside diameter or larger, and between high-pressure hose lines of 1-inch inside diameter or larger, where a connection failure would create a hazard.

§ 77.413 Boilers.

(a) Boilers shall be equipped with guarded, well-maintained water gages and pressure gages placed so that they can be observed easily. Water gages and pipe passages to the gages shall be kept clean and free of scale and rust.

(b) Boilers shall be equipped with automatic pressure-relief valves; valves shall be opened manually at least once a week to determine that they will function properly.

(c) Blowoff valves shall be piped outside the building and shall have outlets so located or protected that persons passing by, near, or under them will not be scalded.

(d) Boiler installations shall be provided with safety devices, acceptable to the Mine Safety and Health Administration, to protect against hazards of flameouts, fuel interruptions, and low-water level.

(e) Boilers shall be inspected internally at least once a year by a licensed inspector and a certificate of inspection signed by the inspector shall be displayed in the vicinity of the boiler.

Subpart F—Electrical Equipment—General

§ 77.500 Electric power circuits and electric equipment; deenergization.

Power circuits and electric equipment shall be deenergized before work is done on such circuits and equipment, except when necessary for troubleshooting or testing.

§ 77.501 Electric distribution circuits and equipment; repair.

No electrical work shall be performed on electric distribution circuits or equipment, except by a qualified person or by a person trained to perform electrical work and to maintain electrical equipment under the direct supervision of a qualified person. Disconnecting devices shall be locked out and suitably tagged by the persons who perform such work, except that in cases where locking out is not possible, such devices shall be opened and suitably tagged by such persons. Locks or tags shall be removed only by the persons who installed them or, if such persons are unavailable, by persons authorized by the operator or his agent.

§ 77.501-1 Qualified person.

A qualified person within the meaning of § 77.501 is an individual who meets the requirements of § 77.103.

§ 77.502 Electric equipment; examination, testing, and maintenance.

Electric equipment shall be frequently examined, tested, and properly maintained by a qualified person to assure safe operating conditions. When a potentially dangerous condition is found on electric equipment, such equipment shall be removed from service until such condition is corrected. A record of such examinations shall be kept.

§ 77.502-1 Qualified person.

A qualified person within the meaning of § 77.502 is an individual who meets the requirements of § 77.103.

§ 77.502-2 Electric equipment; frequency of examination and testing.

The examinations and tests required under the provision of this § 77.502 shall be conducted at least monthly.

§ 77.503 Electric conductors; capacity and insulation.

Electric conductors shall be sufficient in size and have adequate current carrying capacity and be of such construction that a rise in temperature resulting from normal operation will not damage the insulating materials.

§ 77.503-1 Electric conductors.

Electric conductors shall be sufficient in size to meet the minimum current carrying capacity provided for in the National Electric Code, 1968. All trailing cables shall meet the minimum requirements for ampacity provided in the standards of the Insulated Power Cable Engineers Association—National Electric Manufacturers Association in effect when such cables are purchased.

§ 77.504 Electrical connections or splices; suitability.

Electrical connections or splices in electric conductors shall be mechanically and electrically efficient, and suitable connectors shall be used. All electrical connections or splices in insulated wire shall be reinsulated at least to the same degree of protection as the remainder of the wire.

§ 77.505 Cable fittings; suitability.

Cables shall enter metal frames of motors, splice boxes, and electric compartments only through proper fittings. When insulated wires, other than cables, pass through metal frames, the holes shall be substantially bushed with insulated bushings.

§ 77.506 Electric equipment and circuits; overload and short-circuit protection.

Automatic circuit-breaking devices or fuses of the correct type and capacity shall be installed so as to protect all electric equipment and circuits against short circuit and overloads.

§ 77.506-1 Electric equipment and circuits; overload and short circuit protection; minimum requirements.

Devices providing either short circuit protection or protection against overload shall conform to the minimum requirements for protection of electric circuits and equipment of the National Electric Code, 1968.

§ 77.507 Electric equipment; switches.

All electric equipment shall be provided with switches or other controls that are safely designed, constructed, and installed.

§ 77.508 Lightning arresters, ungrounded and exposed power conductors and telephone wires.

All ungrounded, exposed power conductors and telephone wires shall be equipped with suitable lightning arresters which are adequately installed and connected to a low resistance grounding medium.

§ 77.508-1 Lightning arresters; wires entering buildings.

Lightning arresters protecting exposed telephone wires entering buildings shall be provided at the point where each such telephone wire enters the building.

§ 77.509 Transformers; installation and guarding.

(a) Transformers shall be of the totally enclosed type, or shall be placed at least 8 feet above the ground, or installed in a transformer house, or surrounded by a substantial fence at least 6 feet high and at least 3 feet from any energized parts, casings, or wiring.

(b) Transformer stations shall be enclosed to prevent persons from unintentionally or inadvertently contacting energized parts.

(c) Transformer enclosures shall be kept locked against unauthorized entry.

§ 77.510 Resistors; location and guarding.

Resistors, heaters, and rheostats shall be located so as to minimize fire hazards and, where necessary, provided with guards to prevent personal contact.

§ 77.511 Danger signs at electrical installations.

Suitable danger signs shall be posted at all major electrical installations.

§ 77.512 Inspection and cover plates.

Inspection and cover plates on electrical equipment shall be kept in place at all times except during testing or repairs.

§ 77.513 Insulating mats at power switches.

Dry wooden platforms, insulating mats, or other electrically nonconductive material shall be kept in place at all switchboards and power-control switches where shock hazards exist. However, metal plates on which a person normally would stand and which are kept at the same potential as the grounded, metal, non-current-carrying parts of the power switches to be operated may be used.

§ 77.514 Switchboards; passageways and clearance.

Switchboards shall be installed to provide passageways or lanes of travel which permit access to the back of the switchboard from both ends for inspection, adjustment or repair. Openings permitting access to the rear of any switchboard shall be guarded, except where they are located in buildings which are kept locked.

§ 77.515 Bare signal or control wires; voltage.

The voltage on bare signal or control wires accessible to personal contact shall not exceed 40 volts.

§ 77.516 Electric wiring and equipment; installation and maintenance.

In addition to the requirements of §§ 77.503 and 77.506, all wiring and electrical equipment installed after June 30, 1971, shall meet the requirements of the National Electric Code in effect at the time of installation.

Subpart G—Trailing Cables

§ 77.600 Trailing cables; short-circuit protection; disconnecting devices.

Short-circuit protection for trailing cables shall be provided by an automatic circuit breaker or other no less effective device, approved by the Secretary, of adequate current-interrupting capacity in each ungrounded conductor. Disconnecting devices used to disconnect power from trailing cables shall be plainly marked and identified and such devices shall be equipped or designed in such a manner that it can be determined by visual observation that the power is disconnected.

§ 77.601 Trailing cables or portable cables; temporary splices.

Temporary splices in trailing cables or portable cables shall be made in a workmanlike manner and shall be mechanically strong and well insulated. Trailing cables or portable cables with exposed wires or splices that heat or spark under load shall not be used.

§ 77.602 Permanent splicing of trailing cables.

When permanent splices in trailing cables are made, they shall be:

(a) Mechanically strong with adequate electrical conductivity;

(b) Effectively insulated and sealed so as to exclude moisture; and,

(c) Vulcanized or otherwise made with suitable materials to provide good bonding to the outer jacket.

§ 77.603 Clamping of trailing cables to equipment.

Trailing cables shall be clamped to machines in a manner to protect the cables from damage and to prevent strain on the electrical connections.

§ 77.604 Protection of trailing cables.

Trailing cables shall be adequately protected to prevent damage by mobile equipment.

§ 77.605 Breaking trailing cable and power cable connections.

Trailing cable and power cable connections between cables and to power sources shall not be made or broken under load.

§ 77.606 Energized trailing cables; handling.

Energized medium- and high-voltage trailing cables shall be handled only by persons wearing protective rubber gloves (see § 77.606-1) and, with such other protective devices as may be necessary and appropriate under the circumstances.

§ 77.606-1 Rubber gloves; minimum requirements.

(a) Rubber gloves (lineman's gloves) worn while handling high-voltage trailing cables shall be rated at least 20,000 volts and shall be used and tested in accordance with the provisions of §§ 77.704-6 through 77.704-8.

(b) Rubber gloves (wireman's gloves) worn while handling trailing cables energized by 660 to 1,000 volts shall be rated at least 1,000 volts and shall not be worn inside out or without protective leather gloves.

(c) Rubber gloves shall be inspected for defects before use on each shift and at least once thereafter during the shift when such rubber gloves are used for extended periods. All protective rubber gloves which contain defects shall be discarded and replaced prior to handling energized cables.

Subpart H—Grounding

§ 77.700 Grounding metallic sheaths, armors, and conduits enclosing power conductors.

Metallic sheaths, armors, and conduits enclosing power conductors shall be electrically continuous throughout and shall be grounded by methods approved by an authorized representative of the Secretary.

§ 77.700-1 Approved methods of grounding.

Metallic sheaths, armors, and conduits in resistance grounded systems, where the enclosed conductors are a part of the system, will be approved if a solid connection is made to the neutral conductor; in all other systems, the following methods of grounding will be approved:

(a) A solid connection to metal waterlines having low resistance to earth;

(b) A solid connection to a grounding conductor, other than the neutral conductor of a resistance grounded system, extending to a low-resistance ground field;

(c) Any other method of grounding, approved by an authorized representative of the Secretary, which ensures that there is no difference in potential between such metallic enclosures and the earth.

§ 77.701 Grounding metallic frames, casings, and other enclosures of electric equipment.

Metallic frames, casings, and other enclosures of electric equipment that can become "alive" through failure of insulation or by contact with energized parts shall be grounded by methods approved by an authorized representative of the Secretary.

§ 77.701-1 Approved methods of grounding of equipment receiving power from ungrounded alternating current power systems.

For purposes of grounding metallic frames, casings and other enclosures of equipment receiving power from ungrounded alternating current power systems, the following methods of grounding will be approved:

(a) A solid connection between the metallic frame; casing, or other metal enclosure and the grounded metallic sheath, armor, or conduit enclosing the power conductor feeding the electric equipment enclosed;

(b) A solid connection to metal waterlines having low resistance to earth;

(c) A solid connection to a grounding conductor extending to a low-resistance ground field; and,

(d) Any other method of grounding, approved by an authorized representative of the Secretary, which insures that there is no difference in potential between such metal enclosures and the earth.

§ 77.701-2 Approved methods of grounding metallic frames, casings, and other enclosures of electric equipment receiving power from a direct-current power system.

(a) The following methods of grounding metallic frames, casings, and other enclosures of electric equipment receiving power from a direct-current power system with one polarity grounded will be approved:

(1) A solid connection to the grounded power conductor of the system; and,

(2) Any other method, approved by an authorized representative of the Secretary, which insures that there is no difference in potential between such metal enclosures and the earth.

(b) A method of grounding of metallic frames, casings, and other enclosures of electric equipment receiving power from a direct-current power system other than a system with one polarity grounded, will be approved by an authorized representative of the Secretary if the method insures that there is no difference in potential between such frames, casings, and other enclosures, and the earth.

§ 77.701-3 Grounding wires; capacity.

Where grounding wires are used to ground metallic sheaths, armors, conduits, frames, casings, and other metallic enclosures, such grounding wires will be approved if:

(a) Where the power conductor used is No. 6 A.W.G., or larger, the cross-sectional area of the grounding wire is at least one-half the cross-sectional area of the power conductor.

(b) Where the power conductor used is less than No. 6 A.W.G., the cross-sectional area of the grounding wire is equal to the cross-sectional area of the power conductor.

§ 77.701-4 Use of grounding connectors.

If ground wires are attached to grounded power conductors, separate clamps, suitable for such purpose, shall be used and installed to provide a solid connection.

§ 77.702 Protection other than grounding.

Methods other than grounding which provide no less effective protection may be permitted by the Secretary or his authorized representative. Such methods may not be used unless so approved.

§ 77.703 Grounding frames of stationary high-voltage equipment receiving power from ungrounded delta systems.

The frames of all stationary high-voltage equipment receiving power from ungrounded delta systems shall be grounded by methods approved by an authorized representative of the Secretary.

§ 77.703-1 Approved methods of grounding.

The methods of grounding stated in § 77.701-1 will be approved with respect to the grounding of frames of high-voltage equipment referred to in § 77.703.

§ 77.704 Work on high-voltage lines; deenergizing and grounding.

High-voltage lines shall be deenergized and grounded before work is performed on them, except that repairs may be permitted on energized high-voltage lines if (a) such repairs are made by a qualified person in accordance with procedures and safeguards set forth in §§ 77.704-1 through 77.704-11 of this Subpart H as applicable, and (b) the operator has tested and properly maintained the protective devices necessary in making such repairs.

§ 77.704-1 Work on high-voltage lines.

(a) No high-voltage line shall be regarded as deenergized for the purpose of performing work on it, until it has been determined by a qualified person (as provided in § 77.103) that such high-voltage line has been deenergized and grounded. Such qualified person shall by visual observation (1) determine that the disconnecting devices on the high-voltage circuit are in open position, and (2) insure that each ungrounded conductor of the high-voltage circuit upon which work is to be done is properly connected to the system grounding medium. In the case of resistance grounded or solid wye-connected systems, the neutral wire is the system grounding medium. In the case of an ungrounded power system, either the steel armor or conduit enclosing the system or a surface grounding field is a system grounding medium;

(b) No work shall be performed on any high-voltage line which is supported by any pole or structure which also supports other high-voltage lines until: (1) All lines supported on the pole or structure are deenergized and grounded in accordance with all of the provisions of this § 77.704-1 which apply to the repair of deenergized surface high-voltage lines; or (2) the provisions of §§ 77.704-2 through 77.704-10 have been complied with, with respect to all energized lines, which are supported on the pole or structure.

(c) Work may be performed on energized surface high-voltage lines only in accordance with the provisions of §§ 77.704-2 through 77.704-10, inclusive.

§ 77.704-2 Repairs to energized high-voltage lines.

An energized high-voltage line may be repaired only when:

(a) The operator has determined that,

(1) Such repairs cannot be scheduled during a period when the power circuit could be properly deenergized and grounded;

(2) Such repairs will be performed on power circuits with a phase-to-phase nominal voltage no greater than 15,000 volts;

(3) Such repairs on circuits with a phase-to-phase nominal voltage of 5,000 volts or more will be performed only with the use of live line tools; and,

(4) Weather conditions will not interfere with such repairs or expose those persons assigned to such work to an imminent danger; and,

(b) The operator has designated a person qualified under the provisions of § 77.104 as the person responsible for carrying out such repairs and such person, in order to ensure protection for himself and other qualified persons assigned to perform such repairs from the hazards of such repair, has prepared and filed with the operator:

(1) A general description of the nature and location of the damage or defect to be repaired;

(2) The general plan to be followed in making such repairs;

(3) A statement that a briefing of all qualified persons assigned to make such repairs was conducted informing them of the general plan, their individual assignments, and the dangers inherent in such assignments;

(4) A list of the proper protective equipment and clothing that will be provided; and

(5) Such other information as the person designated by the operator feels necessary to describe properly the means or methods to be employed in such repairs.

§ 77.704-3 Work on energized high-voltage surface lines; reporting.

Any operator designating and assigning qualified persons to perform repairs on energized high-voltage surface lines under the provisions of § 77.704-2 shall maintain a record of such repairs. Such record shall contain a notation of the time, date, location, and general nature of the repairs made together with a copy of the information filed with the operator by the qualified person designated as responsible for performing such repairs.

§ 77.704-4 Simultaneous repairs.

When two or more persons are working on an energized high-voltage surface line simultaneously, and any one of them is within reach of another, such persons shall not be allowed to work on different phases or on equipment with different potentials.

§ 77.704-5 Installation of protective equipment.

Before repair work on energized high-voltage surface lines is begun, protective equipment shall be used to cover all bare conductors, ground wires, guys, telephone lines, and other attachments in proximity to the area of planned repairs. Such protective equipment shall be installed from a safe position below the conductors or other apparatus being covered. Each rubber protective device employed in the making of repairs shall have a dielectric strength of 20,000 volts, or more.

§ 77.704-6 Protective clothing; use and inspection.

All persons performing work on energized high-voltage surface lines shall wear protective rubber lineman's gloves, sleeves, and climber guards if climbers are worn. Protective rubber gloves shall not be worn wrong side out or without protective leather gloves. Protective devices worn by a person assigned to perform repairs on high-voltage surface lines shall be worn continuously from the time he leaves the ground until he returns to the ground and, if such devices are employed for extended periods, such person shall visually inspect the equipment assigned him for defects before each use and, in no case, less than twice each day.

§ 77.704-7 Protective equipment; inspection.

Each person shall visually inspect protective equipment and clothing provided him in connection with work on high-voltage surface lines before using such equipment and clothing, and any equipment or clothing containing any defect or damage shall be discarded and replaced with proper protective equipment or clothing prior to the performance of any electrical work on such lines.

§ 77.704-8 Protective equipment; testing and storage.

(a) All rubber protective equipment used on work on energized high-voltage surface lines shall be electrically tested by the operator in accordance with ASTM standards, Part 28, published February 1968, and such testing shall be conducted in accordance with the following schedule:

(1) Rubber gloves, once each month;

(2) Rubber sleeves, once every 3 months;

(3) Rubber blankets, once every 6 months;

(4) Insulator hoods and line hose, once a year; and

(5) Other electric protective equipment, once a year.

(b) Rubber gloves shall not be stored wrong side out. Blankets shall be rolled when not in use, and line hose, and insulator hoods shall be stored in their natural position and shape.

§ 77.704-9 Operating disconnecting or cutout switches.

Disconnecting or cutout switches on energized high-voltage surface lines shall be operated only with insulated sticks, fuse tongs, or pullers which are adequately insulated and maintained to protect the operator from the voltage to which he is exposed. When such switches are operated from the ground, the person using such devices shall wear protective rubber lineman's gloves, except where such switches are bonded to a metal mat as provided in § 77.513.

§ 77.704-10 Tying into energized high-voltage surface circuits.

If the work of forming an additional circuit by tying into an energized high-voltage surface line is performed from the ground, any person performing such work must wear and employ all of the protective equipment and clothing required under the provisions of §§ 77.704-5 and 77.704-6. In addition, the insulated stick used by such person must have been designed for such purpose and must be adequately insulated and be maintained to protect such person from the voltage to which he is exposed.

§ 77.704-11 Use of grounded messenger wires; ungrounded systems.

Solely for purposes of grounding ungrounded high-voltage power systems, grounded messenger wires used to suspend the cables of such systems may be used as a grounding medium.

§ 77.705 Guy wires; grounding.

Guy wires from poles supporting high-voltage transmission lines shall be securely connected to the system ground or be provided with insulators installed near the pole end.

Subpart I—Surface High-Voltage Distribution

§ 77.800 High-voltage circuits; circuit breakers.

High-voltage circuits supplying power to portable or mobile equipment shall be protected by suitable circuit breakers of adequate interrupting capacity which are properly tested and maintained and equipped with devices to provide protection against under voltage, grounded phase, short circuit and overcurrent. High-voltage circuits supplying power to stationary equipment shall be protected against overloads by either a circuit breaker or fuses of the correct type and capacity.

§ 77.800-1 Testing, examination, and maintenance of circuit breakers; procedures.

(a) Circuit breakers and their auxiliary devices protecting high-voltage circuits to portable or mobile equipment shall be tested and examined at least once each month by a person qualified as provided in § 77.103.

(b) Tests shall include:

(1) Breaking continuity of the ground check conductor where ground check monitoring is used; and,

(2) Actuating any of the auxiliary protective relays.

(c) Examination shall include visual observation of all components of the circuit breaker and its auxiliary devices, and such repairs or adjustments as are indicated by such tests and examinations shall be carried out immediately.

§ 77.800-2 Testing, examination, and maintenance of circuit breakers; record.

The operator shall maintain a written record of each test, examination, repair, or adjustment of all circuit breakers protecting high-voltage circuits. Such record shall be kept in a book approved by the Secretary.

§ 77.801 Grounding resistors.

The grounding resistor, where required, shall be of the proper ohmic value to limit the voltage drop in the grounding circuit external to the resistor to not more than 100 volts under fault conditions. The grounding resistor shall be rated for maximum fault current continuously and insulated from ground for a voltage equal to the phase-to-phase voltage of the system.

§ 77.801-1 Grounding resistors; continuous current rating.

The ground fault current rating of grounding resistors shall meet the "extended time rating" set forth in American Institute of Electrical Engineers, Standard No. 32.

§ 77.802 Protection of high-voltage circuits; neutral grounding resistors; disconnecting devices.

High-voltage circuits supplying portable or mobile equipment shall contain either a direct or derived neutral which shall be grounded through a suitable resistor at the source transformers, and a grounding circuit, originating at the grounded side of the grounding resistor, shall extend along with the power conductors and serve as a grounding conductor for the frames of all high-voltage equipment supplied power from that circuit, except that the Secretary or his authorized representative may permit other high-voltage circuits to feed stationary electrical equipment, if he finds that such exception will not pose a hazard to the miners. Disconnecting devices shall be installed and so equipped or designed in such a manner that it can be determined by visual observation that the power is disconnected.

§ 77.803 Fail safe ground check circuits on high-voltage resistance grounded systems.

On and after September 30, 1971, all high-voltage, resistance grounded systems shall include a fail safe ground check circuit or other no less effective device approved by the Secretary to monitor continuously the grounding circuit to assure continuity. The fail safe ground check circuit shall cause the circuit breaker to open when either the ground or ground check wire is broken.

§ 77.803-1 Fail safe ground check circuits; maximum voltage.

The maximum voltage used for ground check circuits under § 77.803 shall not exceed 96 volts.

§ 77.803-2 Ground check systems not employing pilot check wires; approval by the Secretary.

Ground check systems not employing pilot check wires shall be approved by the Secretary only if it is determined that the system includes a fail safe design which will cause the circuit interrupter to open when ground continuity is broken.

§ 77.804 High-voltage trailing cables; minimum design requirements.

(a) High-voltage trailing cables used in resistance grounded systems shall be equipped with metallic shields around each power conductor with one or more ground conductors having a total cross-sectional area of not less than one-half the power conductor, and with an insulated conductor for the ground continuity check circuit. External ground check conductors may be used if they are not smaller than No. 8 (AWG) and have an insulation rated at least 600 volts.

(b) All such high-voltage trailing cables shall be adequate for the intended current and voltage. Splices made in such cables shall provide continuity of all components.

§ 77.805 Cable couplers and connection boxes; minimum design requirements.

(a)(1) Couplers that are used in medium- or high-voltage power circuits shall be of the three-phase type and enclosed in a full metallic shell, except that the Secretary may permit, under such guidelines as he may prescribe, no less effective couplers constructed of materials other than metal.

(2) Cable couplers shall be adequate for the intended current and voltage.

(3) Cable couplers with any metal exposed shall be grounded to the ground conductor in the cable.

(4) Couplers shall be constructed to cause the ground check continuity conductor to break first and the ground conductor last when being un-

coupled when pilot check circuits are used.

(b) Cable connection boxes shall be of substantial construction and designed to guard all energized parts from personal contact.

§ 77.806 Connection of single-phase loads.

Single-phase loads, such as transformer primaries, shall be connected phase to phase in resistance grounded systems.

§ 77.807 Installation of high-voltage transmission cables.

High-voltage transmission cables shall be installed or placed so as to afford protection against damage. They shall be placed to prevent contact with low-voltage or communication circuits.

§ 77.807-1 High-voltage powerlines; clearances above ground.

High-voltage powerlines located above driveways, haulageways, and railroad tracks shall be installed to provide the minimum vertical clearance specified in National Electrical Safety Code: *Provided, however,* That in no event shall any high-voltage powerline be installed less than 15 feet above ground.

§ 77.807-2 Booms and masts; minimum distance from high-voltage lines.

The booms and masts of equipment operated on the surface of any coal mine shall not be operated within 10 feet of an energized overhead powerline. Where the voltage of overhead powerlines is 69,000 volts, or more, the minimum distance from the boom or mast shall be as follows:

Nominal power line voltage (in 1,000 volts)	Minimum distance (feet)
69 to 114	12
115 to 229	15
230 to 344	20
345 to 499	25
500 or more	35

§ 77.807-3 Movement of equipment; minimum distance from high-voltage lines.

When any part of any equipment operated on the surface of any coal mine is required to pass under or by any energized high-voltage powerline and the clearance between such equipment and powerline is less than that specified in § 77.807-2 for booms and masts, such powerlines shall be deenergized or other precautions shall be taken.

§ 77.808 Disconnecting devices.

Disconnecting devices shall be installed at the beginning of each branch line in high-voltage circuits and they shall be equipped or designed in such a manner that it can be determined by visual observation that the circuit is deenergized when such devices are open.

§ 77.809 Identification of circuit breakers and disconnecting switches.

Circuit breakers and disconnecting switches shall be labeled to show which units they control, unless identification can be made readily by location.

§ 77.810 High-voltage equipment; grounding.

Frames, supporting structures, and enclosures of stationary, portable, or mobile high-voltage equipment shall be effectively grounded.

§ 77.811 Movement of portable substations and transformers.

Portable substations and transformers shall be deenergized before they are moved from one location to another.

Subpart J—Low- and Medium-Voltage Alternating Current Circuits

§ 77.900 Low- and medium-voltage circuits serving portable or mobile three-phase alternating current equipment; circuit breakers.

Low- and medium-voltage circuits supplying power to portable or mobile three-phase alternating current equipment shall be protected by suitable circuit breakers of adequate interrupting capacity which are properly tested and maintained and equipped with devices to provide protection against undervoltage, grounded phase, short circuit, and over-current.

§ 77.900-1 Testing, examination, and maintenance of circuit breakers; procedures.

Circuit breakers protecting low- and medium-voltage circuits serving portable or mobile three-phase alternating current equipment and their auxiliary devices shall be tested and examined at least once each month by a person qualified as provided in § 77.103. In performing such tests, the circuit breaker auxiliaries or control circuits shall be actuated in any manner which causes the circuit breaker to open. All components of the circuit breaker and its auxiliary devices shall be visually examined and such repairs or adjustments as are indicated by such tests and examinations shall be carried out immediately.

§ 77.900-2 Testing, examination, and maintenance of circuit breakers; record.

The operator shall maintain a written record of each test, examination, repair or adjustment of all circuit breakers protecting low- and medium-voltage circuits serving three-phase alternating current equipment and such record shall be kept in a book approved by the Secretary.

§ 77.901 Protection of low- and medium-voltage three-phase circuits.

(a) Low- and medium-voltage circuits supplying power to portable or mobile three-phase alternating equipment shall contain:

(1) Either a direct or derived neutral grounded through a suitable resistor at the power source;

(2) A grounding circuit originating at the grounded side of the grounding resistor which extends along with the power conductors and serves as a grounding conductor for the frames of all the electric equipment supplied power from the circuit.

(b) Grounding resistors, where required, shall be of an ohmic value which limits the ground fault current to no more than 25 amperes. Such grounding resistors shall be rated for maximum fault current continuously and provide insulation from ground for a voltage equal to the phase-to-phase voltage of the system.

(c) Low- and medium-voltage circuits supplying power to three-phase alternating current stationary electric equipment shall comply with the National Electric Code.

§ 77.901-1 Grounding resistor; continuous current rating.

The ground fault current rating of grounding resistors shall meet the "extended time rating" set forth in American Institute of Electrical Engineers Standard No. 32.

§ 77.902 Low- and medium-voltage ground check monitor circuits.

On and after September 30, 1971, three-phase low- and medium-voltage resistance grounded systems to portable and mobile equipment shall include a fail safe ground check circuit or other no less effective device approved by the Secretary to monitor continuously the grounding circuit to assure continuity. The fail safe ground check circuit shall cause the circuit breaker to open when either the ground or pilot check wire is broken. Cable couplers shall be constructed to cause the ground check continuity conductor to break first and the ground conductor last when being uncoupled when pilot check circuits are used.

§ 77.902-1 Fail safe ground check circuits; maximum voltage.

The maximum voltage used for ground check circuits under § 77.902 shall not exceed 40 volts.

§ 77.902-2 Approved ground check systems not employing pilot check wires.

Ground check systems not employing pilot check wires shall be approved by the Secretary only after it has been determined that the system includes a fail safe design causing the circuit breaker to open when ground continuity is broken.

§ 77.902-3 Attachment of ground conductors and ground check wires to equipment frames; use of separate connections.

In grounding the frames of stationary, portable, or mobile equipment receiving power from resistance grounded systems, separate connections shall be used.

§ 77.903 Disconnecting devices.

Disconnecting devices shall be installed in circuits supplying power to portable or mobile equipment and shall provide visual evidence that the power is disconnected.

§ 77.904 Identification of circuit breakers.

Circuit breakers shall be labeled to show which circuits they control unless identification can be made readily by location.

§ 77.905 Connection of single-phase loads.

Single-phase loads shall be connected phase-to-phase in resistance grounded systems.

§ 77.906 Trailing cables supplying power to low-voltage mobile equipment; ground wires and ground check wires.

On and after September 30, 1971, all trailing cables supplying power to portable or mobile equipment from low-voltage three-phase resistance grounded power systems shall contain one or more ground conductors having a cross-sectional area of not less than one-half the power conductor. Such trailing cables shall include an insulated conductor for the ground continuity check circuit except where a no less effective device has been approved by the Secretary to assure continuity. Splices made in low-voltage trailing cables shall provide continuity of all components.

Subpart K—Ground Control

§ 77.1000 Highwalls, pits and spoil banks; plans.

Each operator shall establish and follow a ground control plan for the safe control of all highwalls, pits and spoil banks to be developed after June 30, 1971, which shall be consistent with prudent engineering design and will insure safe working conditions. The mining methods employed by the operator shall be selected to insure highwall and spoil bank stability.

§ 77.1000-1 Filing of plan.

The operator shall file a copy of such plan, and revisions thereof, with the Coal Mine Health and Safety District of Subdistrict office for the District or Subdistrict in which the mine is located, and shall identify the name and location of the mine; the Mine Safety and Health Administration identification number if known; and the name and address of the mine operator.

OMB CONTROL No. 1219-0026. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 47 FR 14696, Apr. 6, 1982]

§ 77.1001 Stripping; loose material.

Loose hazardous material shall be stripped for a safe distance from the top of pit or highwalls, and the loose unconsolidated material shall be sloped to the angle of repose, or barriers, baffle boards, screens, or other devices be provided that afford equivalent protection.

§ 77.1002 Box cuts; spoil material placement.

When box cuts are made, necessary precautions shall be taken to minimize the possibility of spoil material rolling into the pit.

§ 77.1003 Benches.

To insure safe operation, the width and height of benches shall be governed by the type of equipment to be used and the operation to be performed.

§ 77.1004 Ground control; inspection and maintenance; general.

(a) Highwalls, banks, benches, and terrain sloping into the working areas shall be examined after every rain, freeze, or thaw before men work in such areas, and such examination shall be made and recorded in accordance with § 77.1713.

(b) Overhanging highwalls and banks shall be taken down and other unsafe ground conditions shall be corrected promptly, or the area shall be posted.

§ 77.1005 Scaling highwalls; general.

(a) Hazardous areas shall be scaled before any other work is performed in the hazardous area. When scaling of highwalls is necessary to correct conditions that are hazardous to persons in the area, a safe means shall be provided for performing such work.

(b) Whenever it becomes necessary for safety to remove hazardous material from highwalls by hand, the hazardous material shall be approached from a safe direction and the material removed from a safe location.

§ 77.1006 Highwalls; men working.

(a) Men, other than those necessary to correct unsafe conditions, shall not work near or under dangerous highwalls or banks.

(b) Except as provided in paragraph (c) of this section, men shall not work between equipment and the highwall or spoil bank where the equipment may hinder escape from falls or slides.

(c) Special safety precautions shall be taken when men are required to perform repair work between immobilized equipment and the highwall or spoil bank and such equipment may hinder escape from falls or slides.

§ 77.1007 Drilling; general.

(a) Equipment that is to be used during a shift shall be inspected each shift by a competent person. Equipment defects affecting safety shall be reported.

(b) Equipment defects affecting safety shall be corrected before the equipment is used.

§ 77.1008 Relocation of drills; safeguards.

(a) When a drill is being moved from one drilling area to another, drill steel, tools, and other equipment shall be secured and the mast placed in a safe position.

(b) When a drill helper is used his location shall be made known to the operator at all times when the drill is being moved.

§ 77.1009 Drill; operation.

(a) While in operation drills shall be attended at all times.

(b) Men shall not drill from positions that hinder their access to the control levers, or from insecure footing or staging, or from atop equipment not designed for this purpose.

(c) Men shall not be on a mast while the drill bit is in operation unless a safe platform is provided and safety belts are used.

(d) Drill crews and others shall stay clear of augers or drill stems that are in motion. Persons shall not pass under or step over a moving stem or auger.

(e) In the event of power failure, drill controls shall be placed in the neutral position until power is restored.

(f) When churn drills or vertical rotary drills are used, drillers shall not be permitted to work under suspended tools, and when collaring holes, inspecting, or during any operation in which tools are removed from the hole, all tools shall be lowered to the ground or platform.

§ 77.1010 Collaring holes.

(a) Starter steels shall be used when collaring holes with hand-held drills.

(b) Men shall not hold the drill steel while collaring holes, or rest their hands on the chuck or centralizer while drilling.

§ 77.1011 Drill holes; guarding.

Drill holes large enough to constitute a hazard shall be covered or guarded.

§ 77.1012 Jackhammers; operation; safeguards.

Men operating or working near jackhammers or jackleg drills, or other drilling machines shall position themselves so that they will not be struck or lose their balance if the drill steel breaks or sticks.

§ 77.1013 Air drills; safeguards.

Air shall be turned off and bled from the air hoses before hand-held air drills are moved from one working area to another.

Subpart L—Fire Protection

§ 77.1100 Fire protection; training and organization.

Firefighting facilities and equipment shall be provided commensurate with the potential fire hazards at each structure, enclosure and other facility (including custom coal preparation) at the mine and the employees at such facilities shall be instructed and trained annually in the use of such firefighting facilities and equipment.

§ 77.1101 Escape and evacuation; plan.

(a) Before September 30, 1971, each operator of a mine shall establish and keep current a specific escape and evacuation plan to be followed in the event of a fire.

(b) All employees shall be instructed on current escape and evacuation plans, fire alarm signals, and applicable procedures to be followed in case of fire.

(c) Plans for escape and evacuation shall include the designation and proper maintenance of adequate means for exit from all areas where persons are required to work or travel including buildings and equipment and in areas where persons normally congregate during the work shift.

OMB Control No. 1219-0051. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 36 FR 13143, July 15, 1971; 47 FR 14706, Apr. 6, 1982]

§ 77.1102 Warning signs; smoking and open flame.

Signs warning against smoking and open flames shall be posted so they can be readily seen in areas or places where fire or explosion hazards exist.

§ 77.1103 Flammable liquids; storage.

(a) Flammable liquids shall be stored in accordance with standards of the National Fire Protection Association. Small quantities of flammable liquids drawn from storage shall be kept in properly identified safety cans.

(b) Unburied flammable-liquid storage tanks shall be mounted securely on firm foundations. Outlet piping shall be provided with flexible connections or other special fittings to prevent adverse effects from tank settling.

(c) Fuel lines shall be equipped with valves to cut off fuel at the source and shall be located and maintained to minimize fire hazards.

(d) Areas surrounding flammable-liquid storage tanks and electric substations and transformers shall be kept free from grass (dry), weeds, underbrush, and other combustible materials such as trash, rubbish, leaves and paper, for at least 25 feet in all directions.

§ 77.1104 Accumulations of combustible materials.

Combustible materials, grease, lubricants, paints, or flammable liquids shall not be allowed to accumulate where they can create a fire hazard.

§ 77.1105 Internal comubstion engines; fueling.

Internal combustion engines, except diesels, shall be shut off and stopped before being fueled.

§ 77.1106 Battery-charging stations; ventilation.

Battery-charging stations shall be located in well-ventilated areas. Battery-charging stations shall be equipped with reverse current protection where such stations are connected directly to direct current power systems.

§ 77.1107 Belt conveyors.

Belt conveyors in locations where fire would create a hazard to personnel shall be provided with switches to stop the drive pulley automatically in the event of excessive slippage.

§ 77.1108 Firefighting equipment; requirements; general.

On and after September 30, 1971, each operator of a coal mine shall provide an adequate supply of firefighting equipment which is adapted to the size and suitable for use under the conditions present on the surface at the mine.

[36 FR 9364, May 22, 1971, as amended at 36 FR 13143, July 15, 1971]

§ 77.1108-1 Type and capacity of firefighting equipment.

Firefighting equipment required under this § 77.1108 shall meet the following minimum requirements:

(a) *Waterlines.* Waterlines shall be capable of delivering 50 gallons of water a minute at a nozzle pressure of 50 pounds per square inch. Where storage tanks are used as a source of water supply, the tanks shall be of 1,000-gallon capacity for each 1,000 tons of coal processed (average) per shift.

(b) *Fire extinguishers.* Fire extinguishers shall be:

(1) Of the appropriate type for the particular fire hazard involved;

(2) Adequate in number and size for the particular fire hazard involved;

(3) Replaced immediately with fully charged extinguishers after any discharge is made from an extinguisher; and

(4) Approved by the Underwriter's Laboratories, Inc., or the Factory Mutual Research Corp., or other competent testing agency acceptable to the Mine Safety and Health Administration.

(c) *Fire hose.* Fire hose and couplings shall meet the requirements of the Underwriter's Laboratories, Inc., or Factory Mutual Research Corp.'s specifications. Cotton or cotton-polyester jacketed hose shall be treated in accordance with the U.S. Department of Agriculture Forest Service Specification 182 for mildew resistance. The water pressure at the hose nozzle shall not be excessively high so as to present a hazard to the nozzle operator.

[36 FR 9364, May 22, 1971, as amended at 47 FR 28096, June 29, 1982]

§ 77.1109 Quantity and location of firefighting equipment.

Preparation plants, dryer plants, tipples, drawoff tunnels, shops, and other surface installations shall be equipped with the following firefighting equipment.

(a) Each structure presenting a fire hazard shall be provided with portable fire extinguishers commensurate with the potential fire hazard at the structure in accordance with the recommendations of the National Fire Protection Association.

(b) Preparation plants shall be equipped with waterlines, with outlet valves on each floor, and with sufficient fire hose to project a water stream to any point in the plant. However, where freezing conditions exist or water is not available, a 125-pound multipurpose dry powder extinguisher may be substituted for the purposes of this paragraph (b) for each 2,500 square feet of floor space in a wooden or other flammable structure, or for each 5,000 square feet of floor space in a metal, concrete-block, or other type of non-flammable construction.

(c)(1) Mobile equipment, including trucks, front-end loaders, bulldozers, portable welding units, and augers, shall be equipped with at least one portable fire extinguisher.

(2) Power shovels, draglines, and other large equipment shall be equipped with at least one portable fire extinguisher; however, additional fire extinguishers may be required by an authorized representative of the Secretary.

(3) Auxiliary equipment such as portable drills, sweepers, and scrapers, when operated more than 600 feet from equipment required to have portable fire extinguishers, shall be equipped with at least one fire extinguisher.

(d) Fire extinguishers shall be provided at permanent electrical installations commensurate with the potential fire hazard at such installation in accordance with the recommendations of the National Fire Protection Association.

(e) Two portable fire extinguishers, or the equivalent, shall be provided at each of the following combustible liquid storage installations:

(1) Near each above ground or unburied combustible liquid storage station; and,

(2) Near the transfer pump of each buried combustible liquid storage tank.

(f) Vehicles transporting explosives and blasting agents shall be equipped with fire protection as recommended in Code 495, section 20, National Fire Protection Association Handbook, 12th Edition, 1962.

§ 77.1110 Examination and maintenance of firefighting equipment.

Firefighting equipment shall be continuously maintained in a usable and operative condition. Fire extinguishers shall be examined at least once every 6 months and the date of such examination shall be recorded on a permanent tag attached to the extinguisher.

OMB CONTROL No. 1219-0050. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 47 FR 14706, Apr. 6, 1982]

§ 77.1111 Welding, cutting, soldering; use of fire extinguisher.

One portable fire extinguisher shall be provided at each location where welding, cutting, or soldering with arc or flame is performed.

§ 77.1112 Welding, cutting, or soldering with arc or flame; safeguards.

(a) When welding, cutting, or soldering with arc or flame near combustible materials, suitable precautions shall be taken to insure that smoldering metal or sparks do not result in a fire.

(b) Before welding, cutting, or soldering is performed in areas likely to contain methane, an examination for methane shall be made by a qualified person with a device approved by the Secretary for detecting methane. Examinations for methane shall be made immediately before and periodically during welding, cutting, or soldering and such work shall not be permitted to commence or continue in air which contains 1.0 volume per centum or more of methane.

Subpart M—Maps

§ 77.1200 Mine map.

The operator shall maintain an accurate and up-to-date map of the mine, on a scale of not less than 100 nor more than 500 feet to the inch, at or near the mine, in an area chosen by the mine operator, with a duplicate copy on file at a separate and distinct location, to minimize the danger of destruction by fire or other hazard. The map shall show:

(a) Name and address of the mine;

(b) The property or boundary lines of the active areas of the mine;

(c) Contour lines passing through whole number elevations of the coalbed being mined. The spacing of such lines shall not exceed 25-foot elevation levels, except that a broader spacing of contour lines may be approved by the District Manager for steeply pitching coalbeds. Contour lines may be placed on overlays or tracings attached to mine maps.

(d) The general elevation of the coalbed or coalbeds being mined, and the general elevation of the surface;

(e) Either producing or abandoned oil and gas wells located on the mine property;

(f) The location and elevation of any body of water dammed or held back in any portion of the mine: *Provided, however,* Such bodies of water may be shown on overlays or tracings attached to the mine maps;

(g) All prospect drill holes that penetrate the coalbed or coalbeds being mined on the mine property;

(h) All auger and strip mined areas of the coalbed or coalbeds being mined on the mine property together with the line of maximum depth of holes drilled during auger mining operations.

(i) All worked out and abandoned areas;

(j) The location of railroad tracks and public highways leading to the mine, and mine buildings of a permanent nature with identifying names shown;

(k) Underground mine workings underlying and within 1,000 feet of the active areas of the mine;

(l) The location and description of at least two permanent base line points, and the location and description of at least two permanent elevation bench marks used in connection with establishing or referencing mine elevation surveys; and,

(m) The scale of the map.

§ 77.1201 Certification of mine maps.

Mine maps shall be made or certified by an engineer or surveyor registered by the State in which the mine is located.

§ 77.1202 Availability of mine map.

The mine map maintained in accordance with the provisions of § 77.1200 shall be available for inspection by the Secretary or his authorized representative.

Subpart N—Explosives and Blasting

§ 77.1300 Explosives and blasting.

(a) No explosives, blasting agent, detonator, or any other related blasting device or material shall be stored, transported, carried, handled, charged, fired, destroyed, or otherwise used, employed or disposed of by any person at a coal mine except in accordance with the provisions of §§ 77.1301 through 77.1304, inclusive.

(b) The term "explosives" as used in this Subpart N includes blasting agents. The standards in this Subpart N in which the term "explosives" appears are applicable to blasting agents (as well as to other explosives) unless blasting agents are expressly excluded.

§ 77.1301 Explosives; magazines.

(a) Detonators and explosives other than blasting agents shall be stored in magazines.

(b) Detonators shall not be stored in the same magazine with explosives.

(c) Magazines other than box type shall be:

(1) Located in accordance with the current American Table of Distances for storage of explosives.

(2) Detached structures located away from powerlines, fuel storage areas, and other possible sources of fire.

(3) Constructed substantially of noncombustible material or covered with fire-resistant material.

(4) Reasonably bullet resistant.

(5) Electrically bonded and grounded if constructed of metal.

(6) Made of nonsparking materials on the inside, including floors.

(7) Provided with adequate and effectively screened ventilation openings near the floor and ceiling.

(8) Kept locked securely when unattended.

(9) Posted with suitable danger signs so located that a bullet passing through the face of a sign will not strike the magazine.

(10) Used exclusively for storage of explosives or detonators and kept free of all extraneous materials.

(11) Kept clean and dry in the interior, and in good repair.

(12) Unheated, unless heated in a manner that does not create a fire or explosion hazard.

(d) Box-type magazines used to store explosives or detonators in work areas shall be constructed with only nonsparking material inside and equipped with covers or doors and shall be located out of the line of blasts.

(e) Secondary and box-type magazines shall be suitably labeled.

(f) Detonator-storage magazines shall be separated by at least 25 feet from explosive-storage magazines.

(g) Cases or boxes containing explosives shall not be stored in magazines on their ends or sides nor stacked more than 6 feet high.

(h) Ammonium nitrate-fuel oil blasting agents shall be physically separated from other explosives, safety fuse, or detonating cord stored in the same magazine and in such a manner that oil does not contaminate the other explosives, safety fuse or detonating cord.

§ 77.1302 Vehicles used to transport explosives.

(a) Vehicles used to transport explosives, other than blasting agents, shall have substantially constructed bodies, no sparking metal exposed in the cargo space, and shall be equipped with suitable sides and tail gates; explosives shall not be piled higher than the side or end.

(b) Vehicles containing explosives or detonators shall be maintained in good condition and shall be operated at a safe speed and in accordance with all safe operating practices.

(c) Vehicles containing explosives or detonators shall be posted with proper warning signs.

(d) Other materials or supplies shall not be placed on or in the cargo space of a conveyance containing explosives, detonating cord or detonators, except for safety fuse and except for properly secured nonsparking equipment used expressly in the handling of such explosives, detonating cord or detonators.

(e) Explosives and detonators shall be transported in separate vehicles unless separated by 4 inches of hardwood or the equivalent.

(f) Explosives or detonators shall be transported promptly without undue delays in transit.

(g) Explosives or detonators shall be transported at times and over routes that expose a minimum number of persons.

(h) Only the necessary attendants shall ride on or in vehicles containing explosives or detonators.

(i) Vehicles shall be attended, whenever practical and possible, while loaded with explosives or detonators.

(j) When vehicles containing explosives or detonators are parked, the brakes shall be set, the motive power shut off, and the vehicles shall be blocked securely against rolling.

(k) Vehicles containing explosives or detonators shall not be taken to a repair garage or shop for any purpose.

§ 77.1303 Explosives, handling and use.

(a) Persons who use or handle explosives or detonators shall be experienced men who understand the hazards involved; trainees shall do such work only under the supervision of and in the immediate presence of experienced men.

(b) Blasting operations shall be under the direct control of authorized persons.

(c) Substantial nonconductive closed containers shall be used to carry explosives, other than blasting agents to the blasting site.

(d) Damaged or deteriorated explosives or detonators shall be destroyed in a safe manner.

(e) Where electric blasting is to be performed, electric circuits to equipment in the immediate area to be blasted shall be deenergized before explosives or detonators are brought into the area; the power shall not be turned on again until after the shots are fired.

(f) Explosives shall be kept separated from detonators until charging is started.

(g) Areas in which charged holes are awaiting firing shall be guarded, or barricaded and posted, or flagged against unauthorized entry.

(h) Ample warning shall be given before blasts are fired. All persons shall be cleared and removed from the blasting area unless suitable blasting shelters are provided to protect men endangered by concussion or flyrock from blasting.

(i) Lead wires and blasting lines shall not be strung across power conductors, pipelines, railroad tracks, or within 20 feet of bare powerlines. They shall be protected from sources of static or other electrical contact.

(j) For the protection of underground workers, special precautions shall be taken when blasting in close proximity to underground operations, and no blasting shall be done that would be hazardous to persons working underground.

(k) Holes shall not be drilled where there is danger of intersecting a charged or misfired hole.

(l) Only wooden or other nonsparking implements shall be used to punch holes in an explosive cartridge.

(m) Tamping poles shall be blunt and squared at one end and made of wood, nonsparking material, or of special plastic acceptable to the Mine Safety and Health Administration.

(n) Delay connectors for firing detonating cord shall be treated and handled with the same safety precautions as blasting caps and electric detonators.

(o) Capped primers shall be made up at the time of charging and as close to the blasting site as conditions allow.

(p) A capped primer shall be prepared so that the detonator is contained securely and is completely embedded within the explosive cartridge.

(q) No tamping shall be done directly on a capped primer.

(r) Detonating cord shall not be used if it has been kinked, bent, or otherwise handled in such a manner that the train of detonation may be interrupted.

(s) Fuse shall not be used if it has been kinked, bent sharply, or handled roughly in such a manner that the train of deflagration may be interrupted.

(t) Blasting caps shall be crimped to fuses only with implements designed for that specific purpose.

(u) When firing from 1 to 15 blastholes with safety fuse ignited individually using hand-held lighters, the fuses shall be of such lengths to provide the minimum burning time specified in the following table for a particular size round:

Number of holes in a round	Minimum burning time, minutes
1	2
2 to 5	2⅔
6 to 10	3⅓
11 to 15	5

In no case shall any 40-second-per-foot safety fuse less than 36 inches long or any 30-second-per-foot safety fuse less than 48 inches long be used.

(v) The burning rate of the safety fuse in use at any time shall be measured, posted in conspicuous locations, and brought to the attention of all men concerned with blasting.

(w) Electric detonators of different brands shall not be used in the same round.

(x) Adequate priming shall be employed to guard against misfires, increased toxic fumes, and poor performance.

(y) Except when being tested with a blasting galvanometer:

(1) Electric detonators shall be kept shunted until they are being connected to the blasting line or wired into a blasting round.

(2) Wired rounds shall be kept shunted until they are being connected to the blasting line.

(3) Blasting lines shall be kept shunted until immediately before blasting.

(z) Completely wired rounds shall be tested with a blasting galvanometer before connections are made to the blasting line.

(aa) Permanent blasting lines shall be properly supported, insulated, and kept in good repair.

(bb) At least a 5-foot airgap shall be provided between the blasting circuit and the power circuit.

(cc) When instantaneous blasting is performed, the double-trunkline or loop system shall be used in detonating-cord blasting.

(dd) When instantaneous blasting is performed, trunklines, in multiple-row blasts, shall make one or more complete loops, with crossties between loops at intervals of not over 200 feet.

(ee) All detonating cord knots shall be tight and all connections shall be kept at right angles to the trunklines.

(ff) Power sources shall be suitable for the number of electrical detonators to be fired and for the type of circuits used.

(gg) Electric circuits from the blasting switches to the blast area shall not be grounded.

(hh) Safety switches and blasting switches shall be labeled, encased in boxes, and arranged so that the covers of the boxes cannot be closed with the switches in the through-circuit or firing position.

(ii) Blasting switches shall be locked in the open position, except when closed to fire the blast. Lead wires shall not be connected to the blasting switch until the shot is ready to be fired.

(jj) The key or other control to an electrical firing device shall be entrusted only to the person designated to fire the round or rounds.

(kk) If branch circuits are used when blasts are fired from power circuits, safety switches located at safe distances from the blast areas shall be provided in addition to the main blasting switch.

(ll) Misfires shall be reported to the proper supervisor and shall be disposed of safely before any other work is performed in that blasting area.

(mm) When safety fuse has been used, men shall not return to misfired holes for at least 30 minutes.

(nn) When electric blasting caps have been used, men shall not return to misfired holes for at least 15 minutes.

(oo) If explosives are suspected of burning in a hole, all persons in the endangered area shall move to a safe location and no one should return to the hole until the danger has passed, but in no case within 1 hour.

(pp) Blasted areas shall be examined for undetonated explosives after each blast and undetonated explosives found shall be disposed of safely.

(qq) Blasted areas shall not be reentered by any person after firing until such time as concentrations of smoke, dust, or fumes have been reduced to safe limits.

(rr) In secondary blasting, if more than one shot is to be fired at one time, blasting shall be done electrically or with detonating cord.

(ss) Unused explosives and detonators shall be moved to a safe location as soon as charging operations are completed.

(tt) When electric detonators are used, charging shall be stopped immediately when the presence of static electricity or stray currents is detected; the condition shall be remedied before charging is resumed.

(uu) When electric detonators are used, charging shall be suspended and men withdrawn to a safe location upon the approach of an electrical storm.

§ 77.1304 Blasting agents; special provisions.

(a) Sensitized ammonium nitrate blasting agents, and the components thereof prior to mixing, shall be mixed and stored in accordance with the recommendations in Bureau of Mines Information Circular 8179, "Safety Recommendations for Sensitized Ammonium Nitrate Blasting Agents," or subsequent revisions.

(b) Where pneumatic loading is employed, before any type of blasting operation using blasting agents is put into effect, an evaluation of the potential hazard of static electricity shall be made. Adequate steps, including the grounding and bonding of the conductive parts of pneumatic loading equipment, shall be taken to eliminate the hazard of static electricity before blasting agent use is commenced.

(c) Pneumatic loading equipment shall not be grounded to waterlines, airlines, rails, or the permanent electrical grounding systems.

(d) Hoses used in connection with pneumatic loading machines shall be of the semiconductive type, having a total resistance low enough to permit the dissipation of static electricity and high enough to limit the flow of stray electric currents to a safe level. Wire-countered hose shall not be used because of the potential hazard from stray electric currents.

Subpart O—Man Hoisting

§ 77.1400 Man hoists and elevators.

The standards set forth in this Subpart O, apply only to hoists and elevators, together with their appurtenances, that are used for hoisting men.

§ 77.1401 Automatic controls and brakes.

Hoists and elevators shall be equipped with overspeed, overwind, and automatic stop controls and with brakes capable of stopping the elevator when fully loaded.

§ 77.1402 Rated capacity.

Hoists and elevators shall have rated capacities consistent with the loads handled and the recommended safety factors of the ropes and cables used.

§ 77.1402-1 Ropes and cables; specifications.

The American National Standards Institute "Specifications for the Use of Wire Ropes for Mines," M 11.1-1960, or the latest revision thereof, shall be used as a guide in the use, selection, installation, and maintenance of wire ropes used for hoisting.

§ 77.1402-2 Maximum load; posting.

The operator shall designate the maximum number of men permitted to ride on each hoist or elevator at one time; this limit shall be posted on each elevator and on each landing.

§ 77.1403 Inspection and maintenance.

(a) Hoists and elevators shall be examined daily and such examinations shall include, but not be limited to, the following:

(1) A visual examination of the rope for wear, broken wires, and corrosion, especially at excessive strain points;

(2) An examination of the rope fastenings for defects;

(3) An examination of the elevator for loose, missing, or defective parts;

(4) An examination of sheaves for broken flanges, defective bearings, rope alignment, and proper lubrication; and

(5) An examination of the automatic controls and brakes required under § 77.1401.

(b) A report of the daily examinations shall be signed by the person making such examination and the report shall be signed or countersigned by any of the persons listed in paragraph (d) of § 77.1713.

(c) Empty conveyances shall be operated at least one round trip before hoisting men after any repairs.

(d) Alterations or changes in a hoist or elevator which might affect its rated capacity shall be made only with the approval of the Coal Mine Health and Safety District Manager or Subdistrict Manager of the district in which the mine is located.

(e) The ropes and cables of hoists and elevators shall be kept well lubricated from end to end as recommended by the manufacturer.

OMB CONTROL No. 1219-0034. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 47 FR 14706, Apr. 6, 1982]

Subpart P—Auger Mining

§ 77.1500 Auger mining; planning.

Auger mining shall be planned and conducted by the operator to insure against any hazard to underground workings located at or near such auger operations and all auger holes shall be located so as to prevent:

(a) The disruption of the ventilation system of any active underground mine;

(b) Inundation hazards from surface water entering any active underground mine;

(c) Damage to the roof and ribs of active underground workings; and

(d) Intersection of auger holes with underground mine workings known to contain dangerous quantities of impounded water.

§ 77.1501 Auger mining; inspections.

(a) The face of all highwalls, to a distance of 25 feet on both sides of each drilling site, shall be inspected by a certified person before any augering operation is begun, and at least once during each coal producing shift and all loose material shall be removed from the drilling site before persons are permitted to enter the drilling area. The results of all such inspections shall be recorded daily in a book approved by the Secretary.

(b) In addition, the face of all highwalls, to a distance of 25 feet on both sides of each drilling site, shall be inspected frequently by a certified person during any auger operation conducted either during or after a heavy rainfall or during any period of intermittent freezing and thawing and the results of such inspections shall be recorded as provided in paragraph (a) of this section.

(c) When an auger hole penetrates an abandoned or mined out area of an underground mine, tests for methane and oxygen deficiency shall be made at the collar of the hole by a qualified person using devices approved by the Secretary to determine if dangerous quantities of methane or oxygen-deficient air are present or being emitted. If such is found no further work shall be performed until the atmosphere has been made safe.

(d) Tests for oxygen deficiency shall be conducted with a permissible flame safety lamp or other means approved by the Secretary and all tests for methane shall be conducted with a methane detector approved by the Secretary.

(e) Internal combustion engines shall not be operated in the vicinity of any auger hole in which tests for methane or oxygen deficiency are being made.

§ 77.1502 Auger holes; restriction against entering.

No person shall be permitted to enter an auger hole except with the approval of the Coal Mine Health and Safety District Manager or Subdistrict Manager of the district in which the mine is located and under such conditions as may be prescribed by such managers.

§ 77.1503 Augering equipment; overhead protection.

(a) Auger machines which are exposed to highwall hazards, together with all those parts of any coal elevating conveyors where persons are required to work during augering operations, shall be covered with heavy gage screen which does not obstruct the view of the highwall and is strong enough to prevent injuries to workmen from falling material.

(b) No work shall be done under any overhang and, when a crew is engaged in connecting or disconnecting auger sections under a highwall, at least one person shall be assigned to observe the highwall for possible movement.

§ 77.1504 Auger equipment; operation.

(a) Persons shall be kept clear of the auger train while it is in motion and shall not be permitted to pass under or over an auger train, except where adequate crossing facilities are provided.

(b) Persons shall be kept clear of auger sections being swung into position.

(c) No person, including the auger machine operator, shall, where practicable, be stationed in direct line with a borehole during augering operations.

(d) Operator of auger equipment shall not leave the controls of such equipment while the auger is in operation.

(e) Adequate illumination shall be provided for work areas after dark.

§ 77.1505 Auger holes; blocking.

Auger holes shall be blocked with highwall spoil or other suitable material before they are abandoned.

Subpart Q—Loading and Haulage

§ 77.1600 Loading and haulage; general.

(a) Only authorized persons shall be permitted on haulage roads and at loading or dumping locations.

(b) Traffic rules, signals, and warning signs shall be standardized at each mine and posted.

(c) Where side or overhead clearances on any haulage road or at any loading or dumping location at the mine are hazardous to mine workers, such areas shall be conspicuously marked and warning devices shall be installed when necessary to insure the safety of the workers.

§ 77.1601 Transportation of persons; restrictions.

No person shall be permitted to ride or be otherwise transported on or in the following equipment whether loaded or empty:

(a) Dippers, shovels, buckets, forks, and clamshells;

(b) The cargo space of dump trucks or haulage equipment used to transport coal or other material;

(c) Outside the cabs and beds of mobile equipment;

(d) Chain, belt, or bucket conveyors, except where such conveyors are specifically designed to transport persons; and

(e) Loaded buckets on aerial tramways.

§ 77.1602 Use of aerial tramways to transport persons.

Persons other than maintenance men shall not ride empty buckets on aerial tramways unless the following features are provided:

(a) Two independent brakes, each capable of holding the maximum load.

(b) Direct communication between terminals.

(c) Power drives with emergency power available in case of primary power failure.

(d) Buckets equipped with positive locks to prevent accidental tripping or dumping.

§ 77.1603 Trains and locomotives; authorized persons.

(a) Only authorized persons shall be permitted to ride on trains or locomotives and they shall ride in a safe position.

(b) Men shall not get on or off moving equipment, except that trainmen may get on or off of slowly moving trains.

§ 77.1604 Transportation of persons; overcrowding.

(a) No man-trip vehicle or other conveyance used to transport persons to and from work areas at surface coal mines shall be overcrowded and all persons shall ride in a safe position.

(b) Supplies, materials, and tools other than small handtools shall not be transported with men in man-trip vehicles unless such vehicles are specifically designed to make such transportation safe.

§ 77.1605 Loading and haulage equipment; installations.

(a) Cab windows shall be of safety glass or equivalent, in good condition and shall be kept clean.

(b) Mobile equipment shall be equipped with adequate brakes, and all trucks and front-end loaders shall also be equipped with parking brakes.

(c) Positive-action type brakes shall be provided on aerial tramways.

(d) Mobile equipment shall be provided with audible warning devices. Lights shall be provided on both ends when required.

(e) Guard nets or other suitable protection shall be provided where tramways pass over roadways, walkways, or buildings.

(f) Guards shall be installed to prevent swaying buckets from hitting towers.

(g) Aerial tramway cable connections shall be designed to offer minimum obstruction to the passage of wheels.

(h) Rocker-bottom or bottom-dump cars shall be equipped with positive locking devices, or other suitable devices.

(i) Ramps and dumps shall be of solid construction, of ample width, have ample clearance and headroom, and be kept reasonably free of spillage.

(j) Chute-loading installations shall be designed so that the men pulling chutes are not required to be in a hazardous position during loading operations.

(k) Berms or guards shall be provided on the outer bank of elevated roadways.

(l) Berms, bumper blocks, safety hooks, or similar means shall be provided to prevent overtravel and overturning at dumping locations.

(m) Roadbeds, rails, joints, switches, frogs, and other elements on railroads shall be designed, installed, and maintained in a safe manner consistent with the speed and type of haulage.

(n) Where practicable, a minimum of 30 inches continuous clearance from the farthest projection of moving railroad equipment shall be provided on at least one side of the tracks; all places where it is not possible to provide 30-inch clearance shall be marked conspicuously.

(o) Track guardrails, lead rails, and frogs shall be protected or blocked so as to prevent a person's foot from becoming wedged.

(p) Positive-acting stop-blocks, derail devices, track skates, or other adequate means shall be installed wherever necessary to protect persons from runaway or moving railroad equipment.

(q) Switch throws shall be installed so as to provide adequate clearance for switchmen.

(r) Where necessary, bumper blocks or the equivalent shall be provided at all track dead ends.

§ 77.1606 Loading and haulage equipment; inspection and maintenance.

(a) Mobile loading and haulage equipment shall be inspected by a competent person before such equipment is placed in operation. Equipment defects affecting safety shall be recorded and reported to the mine operator.

(b) Carriers on aerial tramways, including loading and unloading mechanisms, shall be inspected each shift; brakes shall be inspected daily; ropes and supports shall be inspected as recommended by the manufacturer or as physical conditions warrant. Equipment defects affecting safety shall be reported to the mine operator.

(c) Equipment defects affecting safety shall be corrected before the equipment is used.

§ 77.1607 Loading and haulage equipment; operation.

(a) Vehicles shall follow at a safe distance; passing shall be limited to areas of adequate clearance and visibility.

(b) Mobile equipment operators shall have full control of the equipment while it is in motion.

(c) Equipment operating speeds shall be prudent and consistent with conditions of roadway, grades, clearance, visibility, traffic, and the type of equipment used.

(d) Cabs of mobile equipment shall be kept free of extraneous materials.

(e) Operators shall sit facing the direction of travel while operating equipment with dual controls.

(f) When an equipment operator is present, men shall notify him before getting on or off equipment.

(g) Equipment operators shall be certain, by signal or other means, that all persons are clear before starting or moving equipment.

(h) Where possible, aerial tramways shall not be started until the tramway operator has ascertained that everyone is in the clear.

(i) Dust control measures shall be taken where dust significantly reduces visibility of equipment operators.

(j) Dippers, buckets, loading booms, or heavy suspended loads shall not be swung over the cabs of haulage vehicles until the drivers are out of the cabs and in safe locations, unless the trucks are designed specifically to protect the drivers from falling material.

(k) Men shall not work or pass under the buckets or booms of loaders in operation.

(l) Tires shall be deflated before repairs on them are started and adequate means shall be provided to prevent wheel locking rims from creating a hazard during tire inflation.

(m) Electrically powered mobile equipment shall not be left unattended unless the master switch is in the off position, all operating controls are in the neutral position, and the brakes are set or other equivalent precautions are taken against rolling.

(n) Mobile equipment shall not be left unattended unless the brakes are set. The wheels shall be turned into a bank or berm, or shall be blocked, when such equipment is parked on a grade.

(o) Lights, flares, or other warning devices shall be posted when parked equipment creates a hazard to vehicular traffic.

(p) Dippers, buckets, scraper blades, and similar movable parts shall be secured or lowered to the ground when not in use.

(q) Shovel trailing cables shall not be moved with the shovel dipper unless cable slings or sleds are used.

(r) Equipment which is to be hauled shall be loaded and protected so as to prevent sliding or spillage.

(s) When moving between work areas, the equipment shall be secured in the travel position.

(t) Any load extending more than 4 feet beyond the rear of the vehicle body should be marked clearly with a red flag by day and a red light at night.

(u) Tow bars shall be used to tow heavy equipment and a safety chain shall be used in conjunction with each tow bar.

(v) Railroad cars shall be kept under control at all times by the car dropper. Cars shall be dropped at a safe rate and in a manner that will insure that the car dropper maintains a safe position while working and traveling around the cars.

(w) Railroad cars shall not be coupled or uncoupled manually from the inside of curves unless the railroad and cars are so designed to eliminate any hazard from coupling or uncoupling cars from inside of curves.

(x) Persons shall wear safety belts when dropping railroad cars.

(y) Railcars shall not be left on sidetracks unless ample clearance is provided for traffic on adjacent tracks.

(z) Parked railcars, unless held effectively by brakes, shall be blocked securely.

(aa) Railroad cars and all trucks shall be trimmed properly when they have been loaded higher than the confines of their cargo space.

(bb) When the entire length of a conveyor is visible from the starting switch, the operator shall visually check to make certain that all persons are in the clear before starting the conveyor. When the entire length of the conveyor is not visible from the starting switch, a positive audible or visible warning system shall be installed and operated to warn persons that the conveyor will be started.

(cc) Unguarded conveyors with walkways shall be equipped with emergency stop devices or cords along their full length.

(dd) Adequate backstops or brakes shall be installed on inclined-conveyor drive units to prevent conveyors from running in reverse if a hazard to personnel would be caused.

(ee) Aerial tram conveyor buckets shall not be overloaded, and feed shall be regulated to prevent spillage.

§ 77.1608 Dumping facilities.

(a) Dumping locations and haulage roads shall be kept reasonably free of water, debris, and spillage.

(b) Where the ground at a dumping place may fail to support the weight of a loaded dump truck, trucks shall be dumped a safe distance back from the edge of the bank.

(c) Adequate protection shall be provided at dumping locations where persons may be endangered by falling material.

(d) Grizzlies, grates, and other sizing devices at dump and transfer points shall be anchored securely in place.

(e) If truck spotters are used, they shall be well in the clear while trucks are backing into dumping position and dumping; lights shall be used at night to direct trucks.

Subpart R—Miscellaneous

§ 77.1700 Communications in work areas.

No employee shall be assigned, or allowed, or be required to perform work alone in any area where hazardous conditions exist that would endanger his safety unless he can communicate with others, can be heard, or can be seen.

§ 77.1701 Emergency communications; requirements.

(a) Each operator of a surface coal mine shall establish and maintain a communication system from the mine to the nearest point of medical assistance for use in an emergency.

(b) The emergency communication system required to be maintained under paragraph (a) of this section may be established by telephone or radio transmission or by any other means of prompt communication to any facility (for example, the local sheriff, the State highway patrol, or local hospital) which has available the means of communication with the person or persons providing emergency medical assistance or transportation in accordance with the provisions of paragraph (a) of this section.

§ 77.1702 Arrangements for emergency medical assistance and transportation for injured persons; reporting requirements; posting requirements.

(a) Each operator of a surface coal mine shall make arrangements with a licensed physician, medical service, medical clinic, or hospital to provide 24-hour emergency medical assistance for any person injured at the mine.

(b) Each operator shall make arrangements with an ambulance service, or otherwise provide for 24-hour emergency transportation for any person injured at the mine.

(c) Each operator shall, on or before September 30, 1971, report to the Coal Mine Health and Safety District Manager for the district in which the mine is located the name, title and address of the physician, medical service, medical clinic, hospital, or ambulance service with whom arrangements have been made, or otherwise provided, in accordance with the provisions of paragraphs (a) and (b) of this section.

(d) Each operator shall, within 10 days after any change of the arrangements required to be reported under the provisions of this section, report such changes to the Coal Mine Health and Safety District Manager. If such changes involve a substitution of persons, the operator shall provide the name, title, and address of the person substituted together with the name and address of the medical service, medical clinic, hospital, or ambulance service with which such person or persons are associated.

(e) Each operator shall, immediately after making an arrangement required under the provisions of paragraphs (a) and (b) of this section, or immediately after any change, of such agreement, post at appropriate places at the mine the names, titles, addresses, and telephone numbers of all persons or services currently available under such arrangements to provide medical assistance and transportation at the mine.

OMB Control No. 1219-0036. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 36 FR 13143, July 15, 1971; 47 FR 14696, Apr. 6, 1982]

§ 77.1703 First aid training; supervisory employees.

On or before September 30, 1971, each operator of a surface coal mine shall conduct a first aid training course for selected supervisory employees at the mine, and report in writing to the District Manager the names and job titles of all supervisory employees so trained. Thereafter, each operator shall, within 60 days after the selection of a new supervisory employee to be trained, report in writing to the District Manager the name and job title of such employee and the date on which such employee satisfactorily completed the first aid training course.

OMB Control No. 1219-0038. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 44 FR 9380, Feb. 13, 1979; 47 FR 14696, Apr. 6, 1982; 47 FR 23641, May 28, 1982]

§ 77.1704 First aid training program; availability of instruction to all miners.

On or before December 30, 1971, each operator of a surface coal mine shall make available to all miners employed in the mine a course of instruction in first aid conducted by the operator or under the auspices of the operator, and such a course of instruction shall be made available to newly employed miners within 6 months after the date of employment.

§ 77.1705 First aid training program; retraining of supervisory employees; availability to all miners.

Beginning January 1, 1972, each operator of a surface coal mine shall conduct refresher first aid training programs each calendar year for all selected supervisory employees and make available refresher first aid training courses to all miners employed in the mine.

[36 FR 9364, May 22, 1971, as amended at 36 FR 13143, July 15, 1971]

§ 77.1706 First aid training program; minimum requirements.

(a) All first aid training programs required under the provisions of §§ 77.1703 and 77.1704 shall include 10 class hours of training in a course of instruction similar to that outlined in "First Aid, A Bureau of Mines Instruction Manual."

(b) Refresher first aid training programs required under the provisions of § 77.1705 shall include 5 class hours of refresher training in a course of instruction similar to that outlined in "First Aid, A Bureau of Mines Instruction Manual."

§ 77.1707 First aid equipment; location; minimum requirements.

(a) Each operator of a surface coal mine shall maintain a supply of the first aid equipment set forth in paragraph (b) of this section at or near each working place where coal is being mined, at each preparation plant and at shops and other surface installation where ten or more persons are regularly employed.

(b) The first aid equipment required to be maintained under the provisions of paragraph (a) of this section shall include at least the following:

(1) One stretcher;

(2) One broken-back board (if a splint-stretcher combination is used it will satisfy the requirements of both paragraph (b) (1) of this section and this paragraph (b) (2));

(3) Twenty-four triangular bandages (15 if a splint-stretcher combination is used);

(4) Eight 4-inch bandage compresses;

(5) Eight 2-inch bandage compresses;

(6) Twelve 1-inch adhesive compresses;

(7) An approved burn remedy;

(8) Two cloth blankets;

(9) One rubber blanket or equivalent substitute;

(10) Two tourniquets;

(11) One 1-ounce bottle of aromatic spirits of ammonia or 1 dozen ammonia ampules; and,

(12) The necessary complements of arm and leg splints or two each inflatable plastic arm and leg splints.

(c) All first aid supplies required to be maintained under the provisions of paragraphs (a) and (b) of this section shall be stored in suitable, sanitary, dust tight, moisture proof containers and such supplies shall be accessible to the miners.

§ 77.1708 Safety program; instruction of persons employed at the mine.

On or before September 30, 1971, each operator of a surface coal mine shall establish and maintain a program of instruction with respect to the safety regulations and procedures to be followed at the mine and shall publish and distribute to each employee, and post in conspicuous places throughout the mine, all such safety regulations and procedures established in accordance with the provisions of this section.

[36 FR 9364, May 22, 1971, as amended at 36 FR 13143, July 15, 1971]

§ 77.1709 Safety training; inexperienced employees.

New employees shall be indoctrinated in safety rules and safe work procedures and inexperienced employees shall not be assigned to work duties until they have been trained thoroughly in safe work procedures related to the assigned work duties.

§ 77.1710 Protective clothing; requirements.

Each employee working in a surface coal mine or in the surface work areas of an underground coal mine shall be required to wear protective clothing and devices as indicated below:

(a) Protective clothing or equipment and face-shields or goggles shall be worn when welding, cutting, or working with molten metal or when other hazards to the eyes exist.

(b) Suitable protective clothing to cover the entire body when handling corrosive or toxic substances or other materials which might cause injury to the skin.

(c) Protective gloves when handling materials or performing work which might cause injury to the hands; however, gloves shall not be worn where they would create a greater hazard by becoming entangled in the moving parts of equipment.

(d) A suitable hard hat or hard cap when in or around a mine or plant where falling objects may create a hazard. If a hard hat or hard cap is painted, nonmetallic based paint shall be used.

(e) Suitable protective footwear.

(f) Snug-fitting clothing when working around moving machinery or equipment.

(g) Safety belts and lines where there is danger of falling; a second person shall tend the lifeline when bins, tanks, or other dangerous areas are entered.

(h) Lifejackets or belts where there is danger from falling into water.

(i) Seatbelts in a vehicle where there is a danger of overturning and where roll protection is provided.

(Sec. 101(a) of the Federal Coal Mine Health and Safety Act of 1969, as amended (83 Stat. 745; 30 U.S.C. 811(a))

[36 FR 9382, May 22, 1971, as amended at 36 FR 13143, July 15, 1971; 39 FR 7176, Feb. 25, 1974]

§ 77.1710-1 Distinctively colored hard hats or hard caps; identification for newly employed, inexperienced miners.

Hard hats or hard caps distinctively different in color from those worn by experienced miners shall be worn at all times by each newly employed, inexperienced miner when working in or around a mine or plant for at least one year from the date of his initial employment as a miner or until he has been qualified or certified as a miner by the State in which he is employed.

(Sec. 101(a) of the Federal Coal Mine Health and Safety Act of 1969, as amended (83 Stat. 745; 30 U.S.C. 811(a))

[39 FR 7176, Feb. 25, 1974]

§ 77.1711 Smoking prohibition.

No person shall smoke or use an open flame where such practice may cause a fire or explosion.

§ 77.1712 Reopening mines; notification; inspection prior to mining.

Prior to reopening any surface coal mine after it has been abandoned or declared inactive by the operator, the operator shall notify the Coal Mine Health and Safety District Manager for the district in which the mine is located, and an inspection of the entire mine shall be completed by an authorized representative of the Secretary before any mining operations in such mine are instituted.

§ 77.1713 Daily inspection of surface coal mine; certified person; reports of inspection.

(a) At least once during each working shift, or more often if necessary for safety, each active working area and each active surface installation shall be examined by a certified person designated by the operator to conduct such examinations for hazardous conditions and any hazardous conditions noted during such examinations shall be reported to the operator and shall be corrected by the operator.

(b) If any hazardous condition noted during an examination conducted in accordance with paragraph (a) of this section creates an imminent danger, the person conducting such examination shall notify the operator and the operator shall withdraw all persons from the area affected, except those persons referred to in section 104(d) of the Act, until the danger is abated.

(c) After each examination conducted in accordance with the provisions of paragraph (a) of this section, each certified person who conducted all or any part of the examination required shall enter with ink or indelible pencil in a book approved by the Secretary the date and a report of the condition of the mine or any area of the mine which he has inspected together with a report of the nature and location of any hazardous condition found to be present at the mine. The book in which such entries are made shall be kept in an area at the mine designated by the operator to minimize the danger of destruction by fire or other hazard.

(d) All examination reports recorded in accordance with the provisions of paragraph (c) of this section shall include a report of the action taken to abate hazardous conditions and shall be signed or countersigned each day by at least one of the following persons:

(1) The surface mine foreman;

(2) The assistant superintendent of the mine;

(3) The superintendent of the mine; or,

(4) The person designated by the operator as responsible for health and safety at the mine.

OMB CONTROL No. 1219-0028. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 47 FR 14706, Apr. 6, 1982]

Subpart S—Trolley Wires and Trolley Feeder Wires

§ 77.1800 Cutout switches.

Trolley wires and trolley feeder wires shall be provided with cutout switches at intervals of not more than 2,000 feet and near the beginning of all branch lines.

§ 77.1801 Overcurrent protection.

Trolley wires and trolley feeder wires shall be provided with overcurrent protection.

§ 77.1801-1 Devices for overcurrent protection.

Automatic circuit interrupting devices that will deenergize the affected circuit upon occurrence of a short circuit at any point in the system will meet the requirements of § 77.1801.

§ 77.1802 Insulation of trolley wires, trolley feeder wires and bare signal wires; guarding of trolley wires and trolley feeder wires.

Trolley wires, trolley feeder wires, and bare signal wires shall be adequately guarded:

(a) At all points where men are required to work or pass regularly under the wires; and

(b) At man-trip stations.

The Secretary or his authorized representative shall specify other conditions where trolley wires and trolley feeder wires shall be adequately protected to prevent contact by any person, or shall require the use of improved methods to prevent such contact. Temporary guards shall be provided where trackmen and other persons are required to work in proximity to trolley wires and trolley feeder wires.

Subpart T—Slope and Shaft Sinking

§ 77.1900 Slopes and shafts; approval of plans.

(a) Each operator of a coal mine shall prepare and submit for approval by the Coal Mine Health and Safety District Manager for the district in which the mine is located, a plan providing for the safety of workmen in each slope or shaft that is commenced or extended after June 30, 1971. The plan shall be consistent with prudent engineering design. The methods employed by the operator shall be selected to minimize the hazards to those employed in the initial or subsequent development of any such slope or shaft, and the plan shall include the following:

(1) The name and location of the mine, and the Mine Safety and Health Administration mine identification number, if known;

(2) The name and address of the mine operator;

(3) A description of the construction work and methods to be used in the construction of the slope or shaft, and whether part or all of the work will be performed by a contractor and a description of that part of the work to be performed by a contractor;

(4) The elevation, depth and dimensions of the slope or shaft;

(5) The location and elevation of the coalbed;

(6) The general characteristics of the strata through which the slope or shaft will be developed;

(7) The type of equipment which the operator proposes to use when the work is to be performed by the operator. When work is to be performed by a contractor the operator shall, as soon as known to him, supplement the plan with a description of the type of equipment to be used by the contractor;

(8) The system of ventilation to be used; and

(9) Safeguards for the prevention of caving during excavation.

OMB Control No. 1219-0019. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 47 FR 14696, Apr. 6, 1982; 47 FR 28096, June 29, 1982]

§ 77.1900-1 Compliance with approved slope and shaft sinking plans.

Upon approval by the Coal Mine Health and Safety District Manager of a slope or shaft sinking plan, the operator shall adopt and comply with such plan.

§ 77.1901 Preshift and onshift inspections; reports.

(a) Examinations of slope and shaft areas shall be made by a certified person for hazardous conditions, including tests for methane and oxygen deficiency:

(1) Within 90 minutes before each shift;

(2) At least once on any shift during which men are employed inside any slope or shaft during development; and

(3) Both before and after blasting.

(b) The surface area surrounding each slope and shaft shall be inspected by a certified person and all hazards in the vicinity shall be corrected before men are permitted to enter the excavation.

(c) All hazards found during any preshift or onshift inspection shall be corrected before men are allowed to enter, or continue to work in such slope or shaft. If hazardous conditions cannot be corrected, or excessive methane concentrations cannot be diluted, the excavation shall be vacated and no person shall be permitted to reenter the slope or shaft to continue excavation operations until the hazardous condition has been abated.

(d) No work shall be performed in any slope or shaft, no drilling equipment shall be started, and no electrical equipment shall be energized if the methane content in such slope or shaft is 1.0 volume per centum, or more.

(e) Nothing in this § 77.1901 shall prevent the specific assignment of men in the slope or shaft for purposes of abating excessive methane concentrations or any other hazardous condition.

(f) The results of all inspections conducted in accordance with the provisions of paragraph (a) of this section shall be recorded in a book approved by the Secretary.

OMB Control No. 1219-0033. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 47 FR 14706, Apr. 6, 1982]

§ 77.1901-1 Methane and oxygen deficiency tests; approved devices.

Tests for oxygen deficiency shall be made with a permissible flame safety lamp or other means approved by the Secretary, and tests for methane shall be made with a methane detector approved by the Secretary.

§ 77.1902 Drilling and mucking operations.

Diesel-powered equipment used in the drilling, mucking, or other excavation of any slope or shaft shall be permissible, and such equipment shall be operated in a permissible manner and shall be maintained in a permissible condition.

§ 77.1902-1 Permissible diesel-powered equipment.

Diesel-powered equipment which has been approved by the Bureau of Mines or the Mine Safety and Health Administration under Part 36 of this chapter (Bureau of Mines Schedule 31) is permissible under the provisions of this section.

§ 77.1903 Hoists and hoisting; minimum requirements.

(a) Hoists employed in transporting men and material during drilling, mucking, or other excavating operations in any slope or shaft shall have rated capacities consistent with the loads to be handled and the recommended safety factors of the ropes used in such hoists.

(b) The American National Standards Institute, "Specifications For The Use Of Wire Ropes For Mines," M 11.1-1960, or the latest revision thereof, shall be used as a guide in the use, selection, installation, and maintenance of wire ropes used for hoisting.

(c) Each hoist employed in drilling, mucking, or other excavating operations shall be equipped with an accurate and reliable indicator of the position of the cage, platform, or bucket, which shall be installed in clear view of the hoist operator.

§ 77.1904 Communications between slope and shaft bottoms and hoist operators.

(a) Two independent means of signaling shall be provided between the hoistman and all points in a slope or shaft where men are required to work. At least one of these means shall be audible to the hoistman. Signal codes used in any communication system shall be posted conspicuously at each slope and shaft.

(b) Signaling systems used for communication between slopes and shafts and the hoistman shall be tested daily.

§ 77.1905 Hoist safeguards; general.

(a) Hoists used to transport persons shall be equipped with brakes capable of stopping and holding the cage, bucket, platform, or other device when fully loaded.

(b) When persons are transported by a hoist, a second person familiar with and qualified to stop the hoist shall be in attendance, except where the hoist is fully equipped with overspeed, overwind, and automatic stop devices.

§ 77.1906 Hoists; daily inspection.

(a) Hoists used to transport persons shall be inspected daily, and each such inspection shall include examination of the headgear (headframe, sheave wheels, etc.), ropes, connections, links and chains, and other facilities.

(b) Prior to each working shift, and before a hoist is returned to service after it has been out of normal service for any reason, it shall be operated by the hoistman through one complete cycle of operation before any person is permitted to be transported.

(c) The results of all inspections conducted in accordance with this section shall be recorded in a book approved by the Secretary, and shall be signed by the person making the inspection and shall be signed or countersigned by any of the persons listed in paragraph (d) of § 77.1713.

OMB Control No. 1219-0032. (47 FR 14706, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 47 FR 14706, Apr. 6, 1982]

§ 77.1907 Hoist construction; general.

(a) Hoisting ropes shall be equipped with a spelter-filled socket or a thimble with an adequate number of clamps properly spaced and installed along the rope.

(b) Cages, buckets, or slope cars when used for hoisting or lowering men shall be provided with two bridle chains or cables connected securely to the rope at least 3 feet above the socket or thimble and which are securely fastened to the cage, bucket or slope car.

(c) Where hooks are used to attach cages or buckets to the socket or thimble of a hoisting rope, they shall be self-closing.

(d) Hoisting ropes shall contain at least three full turns on the hoist drum when the rope is extended to its maximum working length. At least one full turn of the hoist rope shall be placed around the drum shaft or around the spoke of a free drum and both shall be fastened securely by means of clamps.

§ 77.1908 Hoist installations; use.

(a) Where men are transported by means of a hoist and the depth of the shaft exceeds 50 feet, the hoist rope shall be suspended from a substantial hoisting installation which shall be high enough to provide working clearance between the bottom of the sheave and the top of the cage or bucket.

(b) Where men are transported by means of a hoist and the depth of the shaft exceeds 100 feet, temporary shaft guides and guide attachments, or other no less effective means, shall be installed to prevent the cage, platform, or bucket from swinging.

(c) All guides and guide attachments, or other no less effective means, installed in accordance with paragraph (b) of this section shall be maintained to a depth of not less than 75 feet from the bottom of the shaft.

(d) Where crossheads are used, the cage, platform, or bucket shall not be hung more than 10 feet below the crosshead.

(e) Where men are required to embark or disembark from a cage, platform or bucket suspended over or within a shaft, a loading platform shall be installed to insure safe footing.

(f) During the development of each slope or shaft, either a ladder or independently powered auxiliary hoist shall be provided to permit men to escape quickly in the event of an emergency.

(g) No person shall be permitted to ride the rim of any bucket or on the top of a loaded bucket.

(h) The number of persons permitted to ride in cages, skips, or buckets shall be limited so as to prevent overcrowding.

(i) Persons shall not be permitted to ride on a cage, skip, or bucket with tools or materials, except when necessary to handle equipment while in transit. Materials shall be secured to prevent shifting while being hoisted.

(j) The speed of buckets transporting persons shall not exceed 500 feet per minute and not more than 200 feet per minute when within 100 feet of any stop.

(k) A notice of established speeds shall be posted in clear view of the hoistman.

(l) Conveyances being lowered in a shaft in which men are working shall be stopped at least 15 feet above such men and shall be lowered further only after the hoistman has received a signal that all men who may be endangered by the conveyance are in the clear.

(m) No skip or bucket shall be raised or lowered in a slope or shaft until it has been trimmed to prevent material from falling back down the slope or shaft.

(n) Measures shall be taken to prevent material from falling back into the shaft while buckets or other conveyances are being unloaded.

(o) Properly attached safety belts shall be worn by all persons required to work in or over any shaft where there is a drop of 10 or more feet, unless other acceptable means are provided to prevent such persons from falling into the shaft.

§ 77.1908-1 Hoist operation; qualified hoistman.

Hoists shall be under the control of and operated by a qualified hoistman when men are in a slope or shaft.

§ 77.1909 Explosives and blasting; use of permissible explosives and shot-firing units.

Except as provided in § 77.1909-1, only permissible explosives and permissible shot-firing units shall be used in sinking shafts and slopes.

§ 77.1909-1 Use of nonpermissible explosives and nonpermissible shot-firing units; approval by Health and Safety District Manager.

Where the Coal Mine Health and Safety District Manager has determined that the use of nonpermissible explosives and nonpermissible shot-firing units will not pose a hazard to any person during the development of a slope or shaft, he may, after written application by the operator, approve the use of such explosives and shot-firing units and issue a permit for the use of such explosives and devices setting forth the safeguards to be employed by the operator to protect the health and safety of any person exposed to such blasting.

OMB Control No. 1219-0025. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[36 FR 9364, May 22, 1971, as amended at 47 FR 14696, Apr. 6, 1982]

§ 77.1910 Explosives and blasting; general.

(a) Light and power circuits shall be disconnected or removed from the blasting area before charging and blasting.

(b) All explosive materials, detonators, and any other related blasting material employed in the development of any slope or shaft shall be stored, transported, carried, charged, and fired in accordance with the provision of Subpart N, "Explosives and Blasting," of this Part 77. Except as provided in paragraph (c) of this section, all shots shall be fired from the surface.

(c) Where tests for methane have been conducted and methane has not been found and only permissible blasting units are being employed, shots may be fired from an upper level of the slope or shaft.

(d) Except as provided in paragraph (c) of this section, all men shall be removed from the slope or shaft prior to blasting.

(e) Blasting areas in slopes or shafts shall be covered with mats or other suitable material when the excavation is too shallow to retain blasted material.

(f) Where it is impracticable to prepare primers in the blasting area, primers may be prepared on the surface and carried into the shaft in specially constructed, insulated, covered containers.

(g) No other development operation shall be conducted in a shaft or at the face of a slope while drill holes are being charged and until after all shots have been fired.

(h) The sides of the slope or shaft between the overhead platform and the bottom where men are working shall be examined after each blast and loose material removed.

(i) Loose rock and other material shall be removed from timbers and platforms after each blast before men are lowered to the shaft bottom.

§ 77.1911 Ventilation of slopes and shafts.

(a) All slopes and shafts shall be ventilated by mechanical ventilation equipment during development. Such equipment shall be examined before each shift and the quantity of air in the slo . or shaft measured daily by a certified person and the results of such examinations and tests recorded in a book approved by the Secretary.

(b) Ventilation fans shall be:

(1) Installed on the surface;

(2) Installed in fireproof housing and connected to the slope or shaft opening with fireproof air ducts;

(3) Designed to permit the reversal of the air current, and located in an area which will prevent a recirculation of air from the slope or shaft or air contamination from any other source;

(4) Equipped with an automatic signal device designed to give an alarm in the event the fan slows or stops which can be seen or heard by any person on duty in the vicinity of the fan, except where fans are constantly attended.

(5) Offset not less than 15 feet from the shaft; and

(6) Equipped with air ducts which are fire resistant and maintained so as to prevent excessive leakage of air;

(i) Flexible ducts shall be constructed to permit ventilation by either exhausting or blowing methods and when metal air ducts are used, they shall be grounded effectively to remove static and other electrical charges;

(ii) Ducts shall extend as close to the bottom as necessary to ventilate properly.

(c) A qualified person, designated by the operator, shall be assigned to maintain each ventilating system.

(d) The fan shall be operated continuously when men are below the surface. Any accidental stoppage or reduction in airflow shall be corrected promptly; however, where repairs cannot be made immediately, development work below the surface shall be stopped and all the men not needed to make necessary repairs shall be removed to the surface.

§ 77.1912 Ladders and stairways.

(a) Substantial stairways or ladders shall be used during the construction of all shafts where no mechanical means are provided for men to travel.

(b) Landings at intervals of not more than 30 feet shall be installed.

(c) Shaft ladders shall project 3 feet above the collar of the shaft, and shall be placed at least 3 inches from the side of the shaft.

§ 77.1913 Fire-resistant wood.

Except for crossties, timbers, and other wood products which are permanently installed in slopes and shafts, shall be fire resistant.

§ 77.1914 Electrical equipment.

(a) Electric equipment employed below the collar of a slope or shaft during excavation shall be permissible and shall be maintained in a permissible condition.

(b) The insulation of all electric conductors employed below the collar of any slope or shaft during excavation shall be of the flame resistant type.

(c) Only lamps and portable flood lights approved by the Bureau of Mines or the Mine Safety and Health Administration under Part 19 and Part 20 of this chapter (Bureau of Mines Schedules 6D and 10C) shall be employed below the collar of any slope or shaft.

§ 77.1915 Storage and handling of combustible materials.

(a) Compressed and liquefied gas, oil, gasoline, and other petroleum products shall not be stored within 100 feet of any slope or shaft opening.

(b) Other combustible material and supplies shall not be stored within 25 feet of any slope or shaft opening.

(c) Pyritic slates, bony coal, culm or other material capable of spontaneous combustion shall not be used for fill or as surfacing material within 100 feet of any slope or shaft opening.

(d) Areas surrounding the opening of each slope or shaft shall be constructed to insure the drainage of flammable liquids away from the slope or shaft in the event of spillage.

(e) Oily rags, waste, waste paper, and other combustible waste material disposed of in the vicinity of any slope or shaft opening shall be stored in closed containers until removed from the area.

§ 77.1916 Welding, cutting, and soldering; fire protection.

(a) One portable fire extinguisher shall be provided where welding, cutting, or soldering with arc or flame is performed.

(b) Welding, cutting, or soldering with arc or flame within or in the vicinity of any slope or shaft, except where such operations are performed in fireproof enclosures, shall be done under the supervision of a qualified person who shall make a diligent search within or in the vicinity of the slope or shaft for fire during and after such operations.

(c) Before welding, cutting, or soldering is performed in any slope or shaft designed to penetrate into any coalbed below the surface, an examination for methane shall be made by a qualified person with a device approved by the Secretary for detecting methane. Examination for methane shall be made immediately before and periodically during welding, cutting, or soldering and such work shall not be permitted to commence or continue in air which contains 1.0 volume per centum or more of methane.

(d) Noncombustible barriers shall be installed below welding, cutting, or soldering operations in or over a shaft.

Subpart U—Approved Books and Records [Reserved]

PART 90—MANDATORY HEALTH STANDARDS—COAL MINERS WHO HAVE EVIDENCE OF THE DEVELOPMENT OF PNEUMOCONIOSIS

Subpart A—General

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90.301 Respirable dust control plan; approval by District Manager; copy to Part 90 miner.

AUTHORITY: Secs. 101 and 103(h) of the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173 as amended by Pub. L. 95-164, 91 Stat. 1291 and 1299 (30 U.S.C. 811 and 813(h)).

SOURCE: 45 FR 80769, Dec. 5, 1980, unless otherwise noted.

Subpart A—General

§ 90.1 Scope.

This Part 90 establishes the option of miners who are employed at underground coal mines or at surface work areas of underground coal mines and who have evidence of the development of pneumoconiosis to work in an area of a mine where the average concentration of respirable dust in the mine atmosphere during each shift is continuously maintained at or below 1.0 milligrams per cubic meter of air. The rule sets forth procedures for miners to exercise this option, and establishes the right of miners to retain their regular rate of pay and receive wage increases. The rule also sets forth the operator's obligations, including respirable dust sampling for Part 90 miners. This Part 90 is promulgated pursuant to section 101 of the Act and supercedes section 203(b) of the Act.

§ 90.2 Definitions.

For the purpose of this Part 90, the term:

"Act" means the Federal Mine Safety and Health Act of 1977, Pub. L. 91-173, as amended by Pub. L. 95-164.

"Active workings" means any place at a coal mine where miners are normally required to work or travel.

"Certified person" means an individual certified by the Secretary in accordance with § 90.202 (Certified person; sampling) to take respirable dust samples required by this part or certified in accordance with § 90.203 (Certified person; maintenance and calibration) to perform the maintenance and calibration of respirable dust sampling equipment as required by this part.

"Concentration" means a measure of the amount of a substance contained per unit volume of air.

"District Manager" means the manager of the Coal Mine Safety and Health District in which the mine is located.

"Mechanized mining unit" means: (1) A unit of mining equipment including hand loading equipment used for the production of material; or (2) a specialized unit which utilizes mining equipment other than specified in § 70.207(e) (Bimonthly sampling; mechanized mining unit).

"MRE instrument" means the gravimetric dust sampler with a four channel horizontal elutriator developed by the Mining Research Establishment of the National Coal Board, London, England.

"MSHA" means the Mine Safety and Health Administration of the Department of Labor.

"Normal work duties" means duties which the Part 90 miner performs on a routine day-to-day basis in his or her job classification at a mine.

"Part 90 miner" means a miner employed at an underground coal mine or at a surface work area of an underground coal mine who has exercised the option under the old section 203(b) program (36 FR 20601, October 27, 1971), or under § 90.3 (Part 90 option; notice of eligibility; exercise of option) of this part to work in an area of a mine where the average concentration of respirable dust in the mine atmosphere during each shift to which that miner is exposed is continuously maintained at or below 1.0 milligrams per cubic meter of air, and who has not waived these rights.

"Quartz" means crystalline silicon dioxide (SiO_2) not chemically combined with other substances and having a distinctive physical structure.

"Respirable dust" means dust collected with a sampling device approved by the Secretary and the Secretary of Health and Human Services in accordance with Part 74 (Coal Mine Dust Personal Sampler Units) of this title. Sampling device approvals issued by the Secretary of the Interior and Secretary of Health, Education, and Welfare are continued in effect.

"Secretary" means the Secretary of Labor or a delegate.

"Secretary of Health and Human Services" means Secretary of Health and Human Services or Secretary of Health, Education, and Welfare.

"Surface work area of an underground coal mine" means the surface areas of land and all structures, facilities, machinery, tools, equipment, shafts, slopes, excavations, and other property, real or personal, placed upon or above the surface of such land by any person, used in, or to be used in, or resulting from, the work of extracting bituminous coal, lignite, or anthracite from its natural deposits underground by any means or method, and the work of preparing the coal so extracted, and includes custom coal preparation facilities;

"Transfer" means any change in the work assignment of a Part 90 miner by the operator and includes: (1) Any change in occupation code of a Part 90 miner; (2) any movement of a Part 90 miner to or from a mechanized mining unit; or (3) any assignment of a Part 90 miner to the same occupation in a different location at a mine.

"Underground coal mine" means an area of land and all structures, facilities, machinery, tools, equipment, shafts, slopes, tunnels, excavations, and other property, real or personal, placed upon, under, or above the surface of such land by any person, used in, or to be used in, or resulting from the work of extracting in such area bituminous coal, lignite, or anthracite from its natural deposits in the earth by any means or method, and the work of preparing the coal so extracted.

"Valid respirable dust sample" means a respirable dust sample collected and submitted as required by this part, and not voided by MSHA.

§ 90.3 Part 90 option; notice of eligibility; exercise of option.

(a) Any miner employed at an underground coal mine or at a surface work area of an underground coal mine who, in the judgment of the Secretary of Health and Human Services, has evidence of the development of pneumoconiosis based on a chest X-ray, read and classified in the manner prescribed by the Secretary of Health and Human Services, or based on other medical examinations shall be afforded the option to work in an area of a mine where the average concentration of respirable dust in the mine atmosphere during each shift to which that miner is exposed is continuously maintained at or below 1.0 milligrams per cubic meter of air. Each of these miners shall be notified in writing of eligibility to exercise the option.

(b) Any miner who is a section 203(b) miner on January 31, 1981, shall be a Part 90 miner on February 1, 1981, entitled to full rights under this part to retention of pay rate, future actual wage increases, and future work assignment, shift and respirable dust protection.

(c) Any Part 90 miner who is transferred to a position at the same or another coal mine shall remain a Part 90 miner entitled to full rights under this part at the new work assignment.

(d) The option to work in a low dust area of the mine may be exercised for the first time by any miner employed at an underground coal mine or at a surface work area of an underground coal mine who was eligible for the option under the old section 203(b) program (36 FR 20601, October 27, 1971), or is eligible for the option under this part by signing and dating the Exercise of Option Form and mailing the form to the Chief, Division of Health, Coal Mine Safety and Health, MSHA, 4015 Wilson Boulevard, Arlington, Virginia 22203.

(e) The option to work in a low dust area of the mine may be re-exercised by any miner employed at an underground coal mine or at a surface work area of an underground coal mine who exercised the option under the old section 203(b) program (36 FR 20601, October 27, 1971), or exercised the option under this part by sending a written request to the Chief, Division of Health, Coal Mine Safety and Health, MSHA, 4015 Wilson Boulevard, Arlington, Virginia 22203. The request should include the name and address of the mine and operator where the miner is employed.

(f) No operator shall require from a miner a copy of the medical information received from the Secretary or Secretary of Health and Human Services.

[45 FR 80769, Dec. 5, 1980; 46 FR 5885, Jan. 21, 1981]

Subpart B—Dust Standards, Rights of Part 90 Miners

§ 90.100 Respirable dust standard.

After the twentieth calendar day following receipt of notification from MSHA that a Part 90 miner is employed at the mine, the operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which the Part 90 miner in the active workings of the mine is exposed at or below 1.0 milligrams per cubic meter of air. Concentrations shall be measured with an approved sampling device and expressed in terms of an equivalent concentration determined in accordance with § 90.206 (Approved sampling devices; equivalent concentrations).

§ 90.101 Respirable dust standard when quartz is present.

When the respirable dust in the mine atmosphere of the active workings to which a Part 90 miner is exposed contains more than 5 percent quartz, the operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which a Part 90 miner is exposed at or below a concentration of respirable dust computed by dividing the percent of quartz into the number 10. The application of the formula shall not result in a respirable dust standard in excess of 1.0 milligrams per cubic meter of air. Concentrations shall be expressed in milligrams per cubic meter of air as measured with an approved sampling device and in terms of an equivalent concentration determined in accordance with § 90.206 (Approved sampling devices; equivalent concentrations).

EXAMPLE: The respirable dust associated with a Part 90 miner contains quartz in the amount of 20%. Therefore, the average concentration of respirable dust in the mine atmosphere associated with that Part 90 miner shall be continuously maintained at or below 0.5 milligrams of respirable dust per cubic meter of air ($10/20=0.5$ mg/m^3).

§ 90.102 Transfer; notice.

(a) Whenever a Part 90 miner is transferred in order to meet the respirable dust standard in § 90.100 (Respirable dust standard) or § 90.101 (Respirable dust standard when quartz is present), the operator shall transfer the miner to an existing position at the same coal mine on the same shift or shift rotation on which the miner was employed immediately before the transfer. The operator may transfer a Part 90 miner to a different coal mine, a newly-created position or a position on a different shift or shift rotation if the miner agrees in writing to the transfer.

(b) On or before the twentieth calendar day following receipt of notification from MSHA that a Part 90 miner is employed at the mine, the operator shall give the District Manager written notice of the occupation and, if applicable, the mechanized mining unit to which the Part 90 miner will be assigned on the twenty-first calendar day following receipt of the notification from MSHA.

(c) After the twentieth calendar day following receipt of notification from MSHA that a Part 90 miner is employed at the mine, the operator shall give the District Manager written notice before any transfer of a Part 90 miner. This notice shall include the scheduled date of the transfer.

§ 90.103 Compensation.

(a) The operator shall compensate each Part 90 miner at not less than the regular rate of pay received by that miner immediately before exercising the option under § 90.3 (Part 90 option; notice of eligibility; exercise of option).

(b) Whenever a Part 90 miner is transferred, the operator shall compensate the miner at not less than the regular rate of pay received by that miner immediately before the transfer.

(c) The operator shall compensate each miner who is a section 203(b) miner on January 31, 1981, at not less than the regular rate of pay that the miner is required to receive under section 203(b) of the Act immediately before the effective date of this part.

(d) In addition to the compensation required to be paid under paragraphs (a), (b) and (c) of this section, the operator shall pay each Part 90 miner the actual wage increases that accrue to the classification to which the miner is assigned.

(e) If a miner is temporarily employed in an occupation other than his or her regular work classification for two months or more before exercising the option under § 90.3 (Part 90 option; notice of eligibility; exercise of option), the miner's regular rate of pay for purposes of paragraph (a) and (b) of this section is the higher of the temporary or regular rates of pay. If the temporary assignment is for less than two months, the operator may pay the Part 90 miner at his or her regular work classification rate regardless of the temporary wage rate.

(f) If a Part 90 miner is transferred, and the Secretary subsequently notifies the miner that notice of the miner's eligibility to exercise the Part 90 option was incorrect, the operator shall retain the affected miner in the current position to which the miner is assigned and continue to pay the affected miner the applicable rate of pay provided in paragraphs (a), (b), (c) and (d) of this section, until:

(1) The affected miner and operator agree in writing to a position with pay at not less than the regular rate of pay for that occupation; or

(2) A position is available at the same coal mine in both the same occupation and on the same shift on which the miner was employed immediately before exercising the option under § 90.3 (Part 90 option; notice of eligibility; exercise of option) or under the old section 203(b) program (36 FR 20601, October 27, 1971).

(i) When such a position is available, the operator shall offer the available position in writing to the affected miner with pay at not less than the regular rate of pay for that occupation.

(ii) If the affected miner accepts the available position in writing, the operator shall implement the miner's reassignment upon notice of the miner's acceptance. If the miner does not accept the available position in writing, the miner may be reassigned and protections under Part 90 shall not apply. Failure by the miner to act on the written offer of the available position within 15 days after notice of the offer is received from the operator shall operate as an election not to accept the available position.

§ 90.104 Waiver of rights; re-exercise of option.

(a) A Part 90 miner may waive his or her rights and be removed from MSHA's active list of miners who have rights under Part 90 by:

(1) Giving written notification to the Chief, Division of Health, Coal Mine Safety and Health, MSHA, that the miner waives all rights under this part;

(2) Applying for and accepting a position in an area of a mine which the miner knows has an average respirable dust concentration exceeding 1.0 milligrams per cubic meter of air or the respirable dust standard established by § 90.101 (Respirable dust standard when quartz is present); or

(3) Refusing to accept another position offered by the operator at the same coal mine that meets the requirements of §§ 90.100, 90.101 and 90.102(a) after dust sampling shows that the average respirable dust concentration in his or her present position exceeds 1.0 milligrams per cubic meter of air or the respirable dust standard established by § 90.101 (Respirable dust standard when quartz is present).

(b) If rights under Part 90 are waived, the miner gives up all rights under Part 90 until the miner re-exercises the option in accordance with § 90.3(e) (Part 90 option; notice of eligibility; exercise of option).

(c) If rights under Part 90 are waived, the miner may re-exercise the option under this part in accordance with § 90.3(e) (Part 90 option; notice of eligibility; exercise of option) at any time.

Subpart C—Sampling Procedures

§ 90.201 Sampling; general requirements.

(a) Each operator shall take respirable dust samples of the concentration of respirable dust in the active workings of the mine as required by this part with a sampling device approved by the Secretary and the Secretary of Health and Human Services under part 74 (Coal Mine Dust Personal Sampler Units) of this title.

(b) Sampling devices shall be worn or carried directly to and from each Part 90 miner's position, and shall remain operational during the entire shift or for 8 hours, whichever time is less.

(c) Upon request from the District Manager, the operator shall submit the date on which collecting any respirable dust samples required by this part will begin.

(d) During the time for abatement fixed in a citation for violation of § 90.100 (Respirable dust standard) or § 90.101 (Respirable dust standard when quartz is present), the operator shall take corrective action and then sample the affected Part 90 miner until five valid respirable dust samples are taken.

(e) The respirable dust samples required by this part shall be collected while the Part 90 miner is performing normal work duties.

(f) Unless otherwise directed by the District Manager, the respirable dust samples required under this part shall be taken by placing the sampling device as follows:

(1) On the Part 90 miner;

(2) On the piece of equipment which the Part 90 miner operates within 36 inches of the normal working position; or

(3) At a location that represents the maximum concentration of dust to which the Part 90 miner is exposed.

§ 90.202 Certified person; sampling.

(a) The respirable dust sampling required by this part shall be done by a certified person.

(b) To be certified, a person shall pass the MSHA examination on sampling of respirable coal mine dust.

(c) A person may be temporarily certified by MSHA to take respirable dust samples if the person receives instruction from an authorized representative of the Secretary in the methods of collecting and submitting samples under this rule. The temporary certification shall be withdrawn if the person does not successfully complete the examination conducted by MSHA on sampling of respirable coal mine dust within six months from the issue date of the temporary certification.

§ 90.203 Certified person; maintenance and calibration.

(a) Approved sampling devices shall be maintained and calibrated by a certified person.

(b) To be certified, a person shall pass the MSHA examination on maintenance and calibration procedures for respirable dust sampling equipment.

(c) A person may be temporarily certified by MSHA to maintain and calibrate approved sampling devices if the person receives instruction from an authorized representative of the Secretary in the maintenance and calibration procedures for respirable dust sampling equipment under this rule. The temporary certification shall be withdrawn if the person does not successfully complete the examination conducted by MSHA on maintenance and calibration procedures within six months from the issue date of the temporary certification.

§ 90.204 Approved sampling devices; maintenance and calibration.

(a) Approved sampling devices shall be maintained as approved under Part 74 (Coal Mine Dust Personal Sampler Units) of this title and calibrated in accordance with MSHA Informational Report No. 1121, "Standard Calibration and Maintenance Procedures for Wet Test Meters and Coal Mine Respirable Dust Samplers (Supersedes IR 1073)," by a person certified in accordance with § 90.203 (Certified person; maintenance and calibration).

(b) Approved sampling devices shall be calibrated at the flowrate of 2.0 liters of air per minute, or at a different flowrate as prescribed by the Secretary and the Secretary of Health and Human Services for a particular device, before they are put into service and at intervals not to exceed 200 hours of operating time thereafter.

(c) A calibration mark shall be placed on the flowmeter of each approved sampling device to indicate the proper position of the float when the sampler is operating at a flowrate of 2.0 liters of air per minute or other flowrate prescribed by the Secretary and the Secretary of Health and Human Services for the particular device. The standard to denote proper flow is when the lowest part of the float is tangent to the top of the calibration mark.

(d) Approved sampling devices shall be tested and examined immediately before each sampling shift and necessary external maintenance shall be performed to assure that the sampling devices are clean and in proper working condition by a person certified in accordance with § 90.202 (Certified person; sampling) or § 90.203 (Certified person; maintenance and calibration). This testing and examination shall include the following:

(1) Testing the voltage of each battery while under actual load to assure the battery is fully charged. The voltage for nickel cadmium cell batteries shall not be lower than the product of the number of cells in the battery pack multiplied by 1.25. The voltage for other than nickel cadmium cell batteries shall not be lower than the product of the number of cells in the battery pack multiplied by the manufacturer's nominal voltage per cell value;

(2) Examination of all components of the cyclone to assure that they are clean and free of dust and dirt;

(3) Examination of the inner surface of the cyclone on the approved sampling device to assure that it is free of scoring;

(4) Examination of the external tubing on the approved sampling device to assure that it is clean and free of leaks; and

(5) Examination of the clamping and positioning of the cyclone body, vortex finder and cassette to assure that they are rigid, in alignment, and firmly in contact.

(e) In accordance with 5 U.S.C. 552(a) MSHA Informational Report No. 1121 referenced in paragraph (a) of this section is hereby incorporated by reference and made a part of this section as if it were set forth in full. The incorporated publication is available without charge at each Coal Mine Safety and Health District and Subdistrict office of MSHA and is on file at the Office of the Federal Register Information Center. Any future amendments to MSHA Informational Report No. 1121 will be announced in the FEDERAL REGISTER. This incorporation by reference was approved March 25, 1980 by the Director of the Office of the Federal Register.

§ 90.205 Approved sampling devices; operation; air flowrate.

(a) Sampling devices approved in accordance with Part 74 (Coal Mine Dust Personal Sampler Units) of this title shall be operated at the flowrate of 2.0 liters of air per minute, or at a different flowrate as prescribed by the Secretary and the Secretary of Health and Human Services for the particular device.

(b) Except as provided in paragraph (d) of this section, each approved sampling device shall be examined each shift by a person certified in accordance with § 90.202 (Certified person; sampling) during the second hour after being put into operation to assure that the sampling device is operating properly and at the proper flowrate. If the proper flowrate is not maintained, necessary adjustments shall be made by the certified person.

(c) Each sampling device shall be examined each shift by a person certified in accordance with § 90.202 (Certified person; sampling) during the last hour of operation to assure that the sampling device is operating properly and at the proper flowrate. If the proper flowrate is not maintained, the respirable dust sample shall be transmitted to MSHA with a notation by the certified person on the dust data card stating that the proper flowrate was not maintained.

(d) Paragraph (b) of this section shall not apply if the approved sampling device is being operated in a breast or chamber of an anthracite coal mine where the full box mining method is used.

§ 90.206 Approved sampling devices; equivalent concentrations.

The concentration of respirable dust shall be determined by dividing the weight of dust in milligrams collected on the filter of an approved sampling device by the volume of air in cubic meters passing through the filter and then converting that concentration to an equivalent concentration as measured with an MRE instrument. To convert a concentration of respirable dust as measured with an approved sampling device to an equivalent concentration of respirable dust as measured with an MRE instrument, the concentration of respirable dust measured with the approved sampling device shall be multiplied by a constant factor prescribed by the Secretary for the approved sampling device used, and the product shall be the equivalent concentration as measured with an MRE instrument.

§ 90.207 Compliance sampling.

(a) The operator shall take five valid respirable dust samples for each Part 90 miner within 15 calendar days after:

(1) The 20-day period specified for each Part 90 miner in § 90.100 (Respirable dust standard);

(2) Receipt of notification from MSHA that any respirable dust sample taken in accordance with § 90.208 (Bimonthly sampling) exceeds 1.0 milligram per cubic meter of air or the respirable dust standard established by § 90.101 (Respirable dust standard when quartz is present); and

(3) Implementing any transfer after the twentieth calendar day following receipt of notification from MSHA that a Part 90 miner is employed at the mine.

§ 90.208 Bimonthly sampling.

(a) Each operator shall take one valid respirable dust sample for each Part 90 miner during each bimonthly period beginning with the bimonthly period of February 1, 1981. The bimonthly periods are:

February 1-March 31
April 1-May 31
June 1-July 31
August 1-September 30
October 1-November 30
December 1-January 31.

(b) When the respirable dust standard is changed in accordance with § 90.101 (Respirable dust standard when quartz is present), respirable dust sampling of Part 90 miners shall begin on the first shift on which the miner is performing normal work duties during the next bimonthly period following notification of such change from MSHA.

(c) Upon issuance of a citation for a violation of § 90.100 (Respirable dust standard) or § 90.101 (Respirable dust standard when quartz is present), paragraphs (a) and (b) of this section shall not apply to that Part 90 miner until the violation is abated in accordance with § 90.201(d) (Sampling; general requirements).

§ 90.209 Respirable dust samples; transmission by operator.

(a) The operator shall transmit within 24 hours after the end of the sampling shift all samples collected to fulfill the requirements of this part in containers provided by the manufacturer of the filter cassette to:

Respirable Dust Processing Laboratory
Pittsburgh Technical Support Center
4800-D Forbes Avenue
Pittsburgh, Pennsylvania 15213

or to any other address designated by the District Manager.

(b) The operator shall not open or tamper with the seal of any filter cassette or alter the weight of any filter cassette before or after it is used to fulfill the requirements of this part.

(c) A person certified in accordance with § 90.202 (Certified person; sampling) shall properly complete the dust data card that is provided by the manufacturer for each filter cassette. The card shall have an identification number identical to that on the cassette used to take the sample and be submitted to MSHA with the sample. Each card shall be signed by the certified person and shall include that person's certification number. Respirable dust samples with data cards not properly completed will be voided by MSHA.

(d) All respirable dust samples collected by the operator shall be considered taken to fulfill the sampling requirements of Part 70, 71 or 90 of this title, unless the sample has been identified in writing by the operator to the District Manager, prior to the intended sampling shift, as a sample to be used for purposes other than required by Part 70, 71 or 90 of this title.

(e) Respirable dust samples received by MSHA in excess of those required by this part shall be considered invalid samples.

OMB CONTROL No. 1219-0011. (47 FR 14696, Apr. 6, 1982)

(Pub. L. No. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.))

[45 FR 80769, Dec. 5, 1980, as amended at 47 FR 14696, Apr. 6, 1982]

§ 90.210 Respirable dust samples; report to operator.

(a) The Secretary shall provide the operator with a report of the following data on respirable dust samples as soon as practicable:

(1) The mine identification number;

(2) The mechanized mining unit, if any, within the mine from which the samples were taken;

(3) The concentration of respirable dust, expressed in milligrams per cubic meter of air, for each valid sample;

(4) The average concentration of respirable dust, expressed in milligrams per cubic meter of air, for all valid samples;

(5) The occupation code;

(6) The reason for voiding any samples; and,

(7) The Social Security Number of the Part 90 miner.

(b) Upon receipt, the operator shall provide a copy of this report to the Part 90 miner. The operator shall not post the original or a copy of this report on the mine bulletin board.

§ 90.220 Status change reports.

If there is a change in the status of a Part 90 miner that affects the respirable dust sampling requirements of this part (such as entering a terminated, injured or ill status, or returning to work), the operator shall report the change in the status of the Part 90 miner to the MSHA District Office or to any other MSHA office designated by the District Manager. Status changes shall be reported in writing within 3 working days after the status change has occurred.

Subpart D—Respirable Dust Control Plans

§ 90.300 Respirable dust control plan; filing requirements.

(a) If an operator abates a violation of § 90.100 (Respirable dust standard) or § 90.101 (Respirable dust standard when quartz is present) by reducing the respirable dust level in the position of the Part 90 miner, the operator shall submit a written respirable dust control plan for that Part 90 miner in that position within 15 calendar days after the citation is terminated to the District Manager for approval. The respirable dust control plan and revisions thereof shall be suitable to the conditions and the mining system of the coal mine and shall be adequate to continuously maintain respirable dust within the permissible concentration for the Part 90 miner in the position identified in the citation.

(b) Each respirable dust control plan shall include at least the following:

(1) The mine identification number assigned by MSHA, the operator's name, mine name, mine address, and mine telephone number and the name, address and telephone number of the principal officer in charge of health and safety at the mine;

(2) The name and Social Security number of the Part 90 miner and the position at the mine to which the plan applies;

(3) A detailed description of the specific respirable dust control measures used to abate the violation of the respirable dust standard; and

(4) A detailed description of how each of the respirable dust control measures described in response to paragraph (b)(3) of this section will continue to be used by the operator, including at least the specific time, place and manner the control measures will be used.

§ 90.301 Respirable dust control plan; approval by district manager; copy to Part 90 miner.

(a) The District Manager will approve respirable dust control plans on a mine-by-mine basis. When approving respirable dust control plans, the District Manager shall consider whether:

(1) The respirable dust control measures would be likely to maintain compliance with the respirable dust standard; and

(2) The operator's compliance with all provisions of the respirable dust control plan could be objectively ascertained by MSHA.

(b) MSHA may take respirable dust samples to determine whether the respirable dust control measures in the operator's plan effectively maintain compliance with the respirable dust standard.

(c) The operator shall comply with all provisions of each respirable dust control plan upon notice from MSHA that the respirable dust control plan is approved.

(d) The operator shall provide a copy of the current respirable dust control plan required under this part to the Part 90 miner. The operator shall not post the original or a copy of the plan on the mine bulletin board.

(e) The operator may review respirable dust control plans and submit proposed revisions to such plans to the District Manager for approval.

SUBCHAPTER P—CIVIL PENALTIES FOR VIOLATIONS OF THE FEDERAL MINE SAFETY AND HEALTH ACT OF 1977

PART 100—CRITERIA AND PROCEDURES FOR PROPOSED ASSESSMENT OF CIVIL PENALTIES

Sec.

100.1 Scope and purpose.
100.2 Applicability.
100.3 Determination of penalty amount; regular assessment.
100.4 Determination of penalty; single penalty assessment.
100.5 Determination of penalty; special assessment.
100.6 Procedures for review of citations and orders; procedures for assessment of civil penalties and conferences.
100.7 Notice of proposed penalty; notice of contest.
100.8 Service.

AUTHORITY: Secs. 105, 110, 508 of the Federal Mine Safety and Health Act of 1977 Pub. L. 91-173, as amended by Pub. L. 95-164, 91 Stat. 1303 and 1311, 83 Stat. 803 (30 U.S.C. 815, 820 and 957).

SOURCE: 47 FR 22294, May 21, 1982, unless otherwise noted.

§ 100.1 Scope and purpose.

This part sets forth the criteria and procedures for the proposed assessment of civil penalties under sections 105 and 110 of the Federal Mine Safety and Health Act of 1977 (Act). The purpose of this part is to provide a fair and equitable procedure for the application of the statutory criteria in determining proposed penalties for violations, to maximize the incentives for mine operators to prevent and correct hazardous conditions, and to assure the prompt and efficient processing and collection of penalties.

§ 100.2 Applicability.

The criteria and procedures contained in this part are applicable to all evaluations and proposed assessments of civil penalties for violations of the Act, and the standards and regulations promulgated pursuant to the Act. The Mine Safety and Health Administration (MSHA), United States Department of Labor, shall review each citation and order and shall make proposed assessments of civil penalties.

§ 100.3 Determination of penalty amount; regular assessment.

(a) *General.* The amount of the civil penalty proposed shall be based upon the formula set forth in this section. The formula is based on the general criteria described in sections 105(b) and 110(i) of the Act. These criteria are:

(1) The appropriateness of the penalty to the size of the business of the operator charged;

(2) The operator's history of previous violations;

(3) Whether the operator was negligent;

(4) The gravity of the violation;

(5) The demonstrated good faith of the operator charged in attempting to achieve rapid compliance after notification of a violation; and

(6) The effect of the penalty on the operator's ability to continue in business.

The penalty amount in a regular case shall be determined by first assigning the appropriate number of penalty points to the violation by using the appropriate criteria and tables set forth in this section. The number of penalty points assigned for all criteria will then be totaled, and the point accumulation converted into a dollar amount by using the penalty conversion table in paragraph (g) of this section. Where appropriate, this penalty amount will be adjusted for demonstrated good faith in accordance with § 100.3(f).

(b) *The appropriateness of the penalty to the size of the operator's business.* The appropriateness of the penalty to the size of the production operator's business is calculated by using both the size of the mine cited and the size of the controlling entity of which the mine is a part. This criterion may account for a maximum of 15 penalty points for production operators. The size of an independent contractor will be measured by the amount of hours worked in all mining activities and may account for a maximum of 10 penalty points. The size will be evaluated by selecting the appropriate number of penalty points from Tables I to V. As used in the Tables below, the terms "annual tonnage" and "annual hours worked" mean tonnage produced and hours worked in the previous calendar year, or, in the case of a mine opened or owned less than one full calendar year, the tonnage and hours worked prorated to an annual basis.

TABLE I.—SIZE OF COAL MINE

Annual tonnage of mine	Penalty points
0 to 15,000	0
Over 15,000 to 30,000	1
Over 30,000 to 50,000	2
Over 50,000 to 100,000	3
Over 100,000 to 200,000	4
Over 200,000 to 300,000	5
Over 300,000 to 500,000	6
Over 500,000 to 800,000	7
Over 800,000 to 1.1 million	8
Over 1.1 to 2 million	9
Over 2 million	10

TABLE II.—SIZE OF CONTROLLING ENTITY—COAL MINE

Annual tonnage	Penalty points
0 to 100,000	0
Over 100,000 to 700,000	1
Over 700,000 to 1.5 million	2
Over 1.5 million to 5 million	3
Over 5 million to 10 million	4
Over 10 million	5

TABLE III.—SIZE OF METAL/NONMETAL MINE

Annual hours worked at mine	Penalty points
0 to 10,000	0
Over 10,000 to 20,000	1
Over 20,000 to 30,000	2
Over 30,000 to 60,000	3
Over 60,000 to 100,000	4
Over 100,000 to 200,000	5
Over 200,000 to 300,000	6
Over 300,000 to 500,000	7
Over 500,000 to 700,000	8
Over 700,000 to 1 million	9
Over 1 million	10

TABLE IV.—SIZE OF CONTROLLING ENTITY—METAL/NONMETAL MINE

Annual hours worked	Penalty points
0 to 60,000	0
Over 60,000 to 400,000	1
Over 400,000 to 900,000	2
Over 900,000 to 3 million	3
Over 3 million to 6 million	4
Over 6 million	5

TABLE V.—SIZE OF INDEPENDENT CONTRACTOR

Annual hours worked at all mines	Penalty points
0 to 10,000	0
Over 10,000 to 20,000	1
Over 20,000 to 30,000	2
Over 30,000 to 60,000	3
Over 60,000 to 100,000	4
Over 100,000 to 200,000	5
Over 200,000 to 300,000	6
Over 300,000 to 500,000	7
Over 500,000 to 700,000	8
Over 700,000 to 1 million	9
Over 1 million	10

(c) *History of previous violations.* History is based on the number of assessed violations in a preceding 24-month period. Only violations that have been paid or finally adjudicated will be included in determining history. However, violations which receive a single penalty assessment under § 100.4 and are paid in a timely manner will not be included in the computation. The history of previous violations may account for a maximum of 20 penalty points. For mine operators, the penalty points will be calculated on the basis of the average number of assessed violations per inspection day (Table VI). For independent contractors, penalty points will be calculated on the basis of the average number of violations assessed per year at all mines (Table VII).

TABLE VI.—MINE OPERATORS

Violations per inspection day	Penalty points
0 to 0.3	0
Over 0.3 to 0.5	2
Over 0.5 to 0.7	4
Over 0.7 to 0.9	6
Over 0.9 to 1.1	8
Over 1.1 to 1.3	10
Over 1.3 to 1.5	12

TABLE VI.—MINE OPERATORS—Continued

Violations per inspection day	Penalty points
Over 1.5 to 1.7	14
Over 1.7 to 1.9	16
Over 1.9 to 2.1	18
Over 2.1	20

TABLE VII.—INDEPENDENT CONTRACTORS

Number of violations	Penalty points
1 to 5	0
6 to 10	2
11 to 15	4
16 to 20	6
21 to 25	8
26 to 30	10
31 to 35	12
36 to 40	14
41 to 45	16
46 to 50	18
Over 50	20

(d) *Negligence.* Negligence is committed or omitted conduct which falls below a standard of care established under the Act to protect persons against the risks of harm. The standard of care established under the Act is that the operator of a mine owes a high degree of care to the miners. A mine operator is required to be on the alert for conditions and hazards in the mine which affect the safety or health of the employees and to take the steps necessary to correct or prevent such conditions or practices. For purposes of assessing a penalty under this part, failure to do so is negligence on the part of the operator. The negligence criterion gives appropriate consideration to the factors relating to an operator's failure to exercise a high degree of care to protect miners from safety or health hazards. When applying this criterion, MSHA considers actions taken by the operator to prevent or correct conditions or practices which caused or allowed the violation to exist. In determining the operator's diligence in protecting miners in any given hazard situation, due recognition is given to mitigating circumstances which explain the operator's conduct in minimizing or eliminating a hazardous condition. Mitigating circumstances may include, but are not limited to, actions which an operator has taken to prevent, correct, or limit exposure to mine hazards. This criterion may contribute a maximum of 25 penalty points, based on conduct evaluated according to Table VIII.

TABLE VIII—NEGLIGENCE

Categories	Penalty points
No negligence (The operator exercised diligence and could not have known of the violative condition or practice.)	0
Low negligence (The operator knew or should have known of the violative condition or practice, but there are considerable mitigating circumstances.)	10
Moderate negligence (The operator knew or should have known of the violative condition or practice, but there are mitigating circumstances.)	15
High negligence (The operator knew or should have known of the violative condition or practice, and there are no mitigating circumstances.)	20
Reckless disregard (The operator displayed conduct which exhibits the absence of the slightest degree of care.)	25

(e) *Gravity.* Gravity is an evaluation of the seriousness of the violation as measured by the likelihood of the occurrence of the event against which a standard is directed, the severity of the illness or injury if the event occurred or were to occur, and the number of persons potentially affected if the event occurred or were to occur. This criterion may contribute a maximum of 30 penalty points, with up to 10 points derived from each of the following tables (Tables IX to XI):

TABLE IX.—LIKELIHOOD

Likelihood of occurrence	Penalty points
No likelihood	0
Unlikely	2
Reasonably likely	5
Highly likely	7
Occurred	10

TABLE X.—SEVERITY

Severity of injury or illness if the event occurred or were to occur	Penalty points
No lost work days (All occupational injuries and illnesses as defined in 30 CFR Part 50 except those listed below.)	0
Lost work days or restricted duty (Any injury or illness which would cause the injured or ill person to lose one full day of work or more after the day of the injury or illness, or which would cause one full day or more of restricted duty.)	3
Permanently disabling (Any injury or illness which would be likely to result in the total or partial loss of the use of any member or function of the body.)	7
Fatal (Any work-related injury or illness resulting in death, or which has a reasonable potential to cause death.)	10

TABLE XI.—PERSONS POTENTIALLY AFFECTED

Number of persons potentially affected if the event occurred or were to occur	Penalty points
0	0
1	1
2	2
3	4
4 to 5	6
6 to 9	8
More than 9	10

(f) *Demonstrated good faith of the operator in abating the violation.* This criterion provides a 30% reduction in the penalty amount of a regular assessment where the operator abates the violation in the time set by the inspector. Where the operator does not abate within the time set by the inspector, 10 penalty points will be assigned.

(g) *Penalty conversion table.* The penalty conversion table shall be used to convert the accumulation of penalty points to the appropriate proposed monetary assessment.

PENALTY CONVERSION TABLE

Points	Penalty
15 or fewer	$30
16	32
17	34
18	36
19	38
20	40
21	44
22	48
23	52
24	$56
25	60
26	66
27	72
28	78
29	84
30	90
31	98
32	106
33	114
34	122
35	130
36	140
37	150
38	160
39	170
40	180
41	195
42	210
43	225
44	240
45	255
46	275
47	295
48	305
49	325
50	345
51	370
52	395
53	420
54	445
55	470
56	500
57	530
58	560
59	590
60	620
61	655
62	690
63	725
64	760
65	800
66	840
67	880
68	920
69	960
70	1,000
71	1,050
72	1,100
73	1,150
74	1,200
75	1,250
76	1,300
77	1,400
78	1,500
79	1,600
80	1,700
81	1,900
82	2,100
83	2,300
84	2,500
85	2,700
86	3,000
87	3,400
88	3,800
89	4,200
90	4,600
91	5,000
92	5,500
93	6,000

PENALTY CONVERSION TABLE—Continued

Points	Penalty
94	$6,500
95	7,000
96	7,500
97	8,000
98	8,500
99	9,000
100	10,000

(h) *The effect on the operator's ability to continue in business.* It is initially presumed that the operator's ability to continue in business will not be affected by the assessment of a civil penalty. The operator may submit information to the District Manager concerning the business financial status to show that payment of the penalty will affect the operator's ability to continue in business. If the information provided by the operator indicates that the penalty will adversely affect the ability to continue in business the penalty may be adjusted.

§ 100.4 Determination of penalty; single penalty assessment.

An assessment of $20 may be imposed as the civil penalty where the violation is not reasonably likely to result in a reasonably serious injury or illness, and is abated within the time set by the inspector. If the violation is not abated within the time set by the inspector, the violation will not be eligible for the $20 single penalty and will be processed through either the regular assessment provision (§ 100.3) or special assessment provision (§ 100.5).

§ 100.5 Determination of penalty; special assessment.

MSHA may elect to waive the regular assessment formula (§ 100.3) or the single assessment provision (§ 100.4) if the Agency determines that conditions surrounding the violation warrant a special assessment. Although an effective penalty can generally be derived by using the regular assessment formula and the single assessment provision, some types of violations may be of such a nature or seriousness that it is not possible to determine an appropriate penalty under these provisions. Accordingly, the following categories will be individually reviewed to determine whether a special assessment is appropriate:

(a) Violations involving fatalities and serious injuries;

(b) Unwarrantable failure to comply with mandatory health and safety standards;

(c) Operation of a mine in the face of a closure order;

(d) Failure to permit an authorized representative of the Secretary to perform an inspection or investigation;

(e) Violations for which individuals are personally liable under Section 110(c) of the Act;

(f) Violations involving an imminent danger;

(g) Discrimination violations under Section 105(c) of the Act; and

(h) Violations involving an extraordinarily high degree of negligence or gravity or other unique aggravating circumstances.

When MSHA determines that a special assessment is appropriate, such special assessment shall take into account the criteria enumerated in § 100.3(a). All findings shall be in narrative form.

§ 100.6 Procedures for review of citations and orders; procedures for assessment of civil penalties and conferences.

(a) All parties shall be afforded the opportunity to review with MSHA each citation and order issued during an inspection.

(b) Upon notice by MSHA, all parties shall have 10 days within which to submit additional information or request a safety and health conference with the District Manager or designee. A conference request may include a request to be notified of, and to participate in, a conference initiated by another party.

(c) It is within the sole discretion of MSHA to grant a request for a conference and to determine the nature of the conference.

(d) When a conference is conducted, the parties may submit any additional relevant information relating to the violation, either prior to or at the conference. To expedite the conference, the official assigned to the case may contact the parties to discuss the issues involved prior to the conference.

(e) MSHA will consider all relevant information submitted in a timely manner by the parties with respect to the violation. When the facts warrant a finding that no violation occurred, the citation or order will be vacated.

(f) All citations which have been abated and all orders will be promptly referred by the District Manager to the Office of Assessments.

(g) The Office of Assessments will use the citations, orders, and inspector's evaluation as the basis for determining the appropriate amount of a proposed penalty.

§ 100.7 Notice of proposed penalty; notice of contest.

(a) A notice of proposed penalty will be issued and served by certified mail upon the party to be charged and by regular mail to the representative of miners at the mine after the time permitted to request a conference under § 100.6 expires, or upon the completion of a conference, or upon review by MSHA of additional information submitted in a timely manner.

(b) Upon receipt of the notice of proposed penalty, the party charged shall have 30 days to: (1) Pay the proposed assessment (acceptance by MSHA of payment tendered by the party charged will close the case); or, (2) notify MSHA in writing of the intention to contest the proposed penalty. The Office of Assessments shall provide a return mailing card with each notice of proposed penalty to be used by the party charged to request a hearing before the Federal Mine Safety and Health Review Commission under Section 105 of the Act. Such a request must be sent to the address listed on such notification. When MSHA receives the notice of contest, it shall immediately advise the Commission of such notice, and shall promptly forward the case to the Office of the Solicitor. No proposed penalty which has been contested before the Commission, shall be compromised, mitigated or settled except with the approval of the Commission.

(c) The failure to pay or to contest the proposed penalty within 30 days of receipt of notice thereof shall result in the proposed penalty being deemed a final order of the Commission and not subject to review by any court or agency.

§ 100.8 Service.

(a) All operators are required by 30 CFR Part 41 (Notification of Legal Identity) to file with MSHA the name and address of record of the operator. All representatives of miners are required by 30 CFR Part 40 (Representative of Miners) to file with MSHA the mailing address of the person or organization acting in a representative capacity. Proposed penalty assessments delivered to those addresses shall constitute service.

(b) If any of the parties choose to have proposed penalty assessments mailed to a different address, the Office of Assessments must be notified in writing of the new address. Delivery to this address shall also constitute service.

(c) Service for operators who fail to file under 30 CFR Part 41 will be upon the last known business address recorded with MSHA.

PARTS 101-199—[RESERVED]

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FINDING AIDS

A list of CFR titles, subtitles, chapters, subchapters and parts and an alphabetical list of agencies publishing in the CFR are included in the CFR Index and Finding Aids volume to the Code of Federal Regulations which is published separately and revised annually.

Material Approved for Incorporation by Reference
Table of CFR Titles and Chapters
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The Director of the Federal Register approves the following incorporations by reference effective July 1, 1982, unless otherwise noted (5 U.S.C. 552(a) and 1 CFR Part 51). For more information on incorporation by reference, see the preliminary pages of this volume.

30 CFR CHAPTER I (PARTS 0 TO 199)
MINE SAFETY AND HEALTH ADMINISTRATION, DEPARTMENT OF LABOR

(Copies of material incorporated in Parts 55, 56, and 57 are available at MSHA Metal and Nonmetal Mine Safety and Health District and Subdistrict Offices. Copies of material incorporated in parts 70, 71, 75 and 77 are available at MSHA Coal Mine Safety and Health District and Subdistrict Offices. For a complete listing of these addresses, see the end of this table.)

	30 CFR
American Conference of Governmental Industrial Hygienists P.O. Box 1937, Cincinnati, OH 45201	
TLVs: Threshold Limit Values for Chemical Substances in Workroom Air (1973).	55.5–1; 56.5–1; 57.5–1
TLVs: Threshold Limit Values of Airborne Contaminants (1972)	71.700; 75.301–2
American Insurance Association 85 John St., New York, NY 10038	
National Building Code, 1967	71.402; 75.1712–3
American National Standards Institute 1430 Broadway, New York, NY 10018	
ANSI/ASTM F432–78 Specifications for Roof Bolting Materials in Coal Mines.	75.200–7
ANSI K13.1–73 Identification of Air Purifying Respirator Canisters and Cartridges.. (Copies of the above document are also available for inspection at MSHA Coal or Metal and Nonmetal Mine Safety and Health District and Subdistrict Offices.)	11.93
ANSI N13.8–73 Radiation Protection in Uranium Mines	57.5–37; 57.5–40; 57.5–47
ANSI S1.4–71 General Purpose Sound Level Meters	55.5–50; 56.5–50; 57.5–50; 70.500; 70.505
ANSI-ASA 40.8–55 National Plumbing Code.	71.402; 71.602; 75.1712–3
ANSI B57.1–65 Compressed Gas Cylinder Valve Outlet and Inlet Connections.. (Copies of the above document are available at MSHA Metal and Nonmetal Mine Safety and Health District and Subdistrict Offices.)	11.80
ANSI M11.1–60 Specification for Use of Wire Rope for Mines	77.1402–1; 77.1903
ANSI Z88.2–69 Practices for Respiratory Protection	11.2–1; 11.4; 55.5–5; 56.5–5; 57.5–5
American Society of Mechanical Engineers 345 E. 47th St., New York, NY 10017	

Title 30—Mineral Resources

ASME Boiler and Pressure Vessel Code, 1977:	
Sections I–VIII	55.13–1; 56.13–1; 57.13–1
Sections I–VII	55.13–30; 56.13–30; 57.13–30
ASME Boiler and Pressure Vessel Code, 1971:	
Sections I–VIII	77.411
Section VIII	75.1730
American Society for Testing Materials	
Book of ASTM Standards, 1968: Part 28, Rubber, Carbon Black; Gaskets.	75.705–8; 77.704–8
E 84–68 Surface Characteristics of Building Materials	75.302–3
E 162–67 Surface Flammability of Materials Using A Radiant Heat Energy Source.	75.302–3
American Welding Society	
AWS D1.1–1973 Structural Welding Code	77.403a
California, State of	
California Administrative Code: Title 8	
Article 7—Logging and Sawmill Safety Orders Section 5243—Tractor Yarding (Register 69, No. 10—3–8–69).	55.9–88; 56.9–88; 57.9–88; 77.403a
Article 10—Construction Safety Orders Sections 1591(i) and 1596—Haulage and Earth Moving (Register 70, No. 40—10–3–70).	55.9–88; 56.9–88; 57.9–88; 77.403a
Article 25—General Industry Safety Orders Section 3650–55—Industrial Trucks, Tractors, Haulage Vehicles, and Earth Moving Equipment (Register 72, No. 6—2–5–72).	55.9–88; 56.9–88; 57.9–88
Section 2655—Overhead Guards for High-Lift Rider Trucks (Register 72, No.6—2–8–72).	77.403
National Bureau of Standards, Department of Commerce	
National Electrical Safety Code, 1961; Part 2: Safety Rules for the Installation and Maintenance of Electric Supply and Communications Lines; and Supplement 2 (1968).	55.12–47; 56.12–47; 57.12–47
National Electrical Safety Code, 1971	77.907–1
Department of Defense	
Copies of military specifications and standards incorporated in Parts 11, 28 and 29 are available at: MSHA Approval and Certification Center, Box 201B, Industrial Park Blvd., Triadelphia, WV 26059.	
MIL–F–15160D Fuses; Instrument, Power, and Telephone	28.31
MIL–STD–105D Sampling Procedures and Tables for Inspection by Attributes.	11.41; 11.43; 29.41
MIL–STD–248 Welding and Brazing: Procedure and Performance Qualification.	77.403a
MIL–STD–414 Sampling Procedures and Tables for Inspection by Variables for Percent Defective.	11.41; 11.43; 29.41
General Services Administration	
The following document is available at MSHA Metal and Nonmetal Mine Safety and Health District and Subdistrict Offices.	
Federal Specification GGG–M–125d–1965 Mask, Air Line: and Respirator, Air Filtering, Industrial.	11.76; 11.99; 11.116; 11.179
Institute of Electrical and Electronics Engineers, Inc.	
IEEE standard No. 32—1972 Requirements, Terminology, and Test Procedures for Neutral Grounding Devices.	75.1719–2: 77.801–1; 77.901–1
Department of the Interior	
Bureau of Mines Instruction Guide No. 2—MSA W–65 Self Rescuer (1972).	57.18–28

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Bureau of Mines Instruction Guide No. 3—Permissible Drager 810 Respirator for Self-Rescue (1972).	57.18–28
Bureau of Mines Instruction Guide No. 19—Mine Emergency Training (1972).	57.18–28
Safety and Health Regulations for Construction (1971); Part II—Bureau of Reclamation Supplement; Section 9—Machinery and Mechanized Equipment.	55.9–88; 56.9–88; 57.9–88
Mine Safety and Health Administration, Department of Labor	
MSHA Information Report No. 1121—1980 Standard Calibration and Maintenance Procedures for Wet Test Meters and Coal Mine Respirable Dust Samplers.	70.204; 71.204; 90.204
National Board of Boiler and Pressure Vessel Inspectors 1055 Crupper Ave., Columbus, OH 43229	
National Board Inspection Code, 1979	55.13–15; 56.13–15; 57.13–15
Chapter I–V and Appendices	55.13–30; 56.13–30; 57.13–30
National Fire Protection Association	
National Electrical Code, 1968	55.12–45; 55.12–48; 56.12–45; 56.12–48; 57.12–45; 57.12–48; 75.513–1; 75.518–1; 77.503–1; 77.506–1; 77.516; 77.901
NFPA 11A—1970 High Expansion Foam Systems	75.1107–16
NFPA 13—1968–1969 Installation of Sprinkler Systems	75.1101–7
NFPA 13A—1971 Care and Maintenance of Sprinkler Systems	75.1107–16
NFPA 15—1969 Water Spray Fixed Systems for Fire Protection	75.1107–16
NFPA 17—1969 Dry Chemical Extinguishing Systems	75.1107–16
NFPA 22—1971 Water Tanks for Private Fire Protection	75.1107–3; 75.1107–13
NFPA 30—1969 Flammable and Combustible Liquids Code	57.4–4; 77.1103
NFPA 60—1961 Installation and Operation of Pulverized Fuel Systems	77.301
NFPA 72A—1967 Local Protective Signaling Systems	75.1103–2; 75.1107–4; 75.1107–16
NFPA 198—1959 Care of Fire Hose	75.1107–16
NFPA 252—1972 Standard Method of Fire Tests of Door Assemblies	57.2
Society of Automotive Engineers	
SAE J4C—1955 (R 65) Motor Vehicle Seat Belt Assemblies	55.9–88; 56.9–88; 57.9–88
SAE J140a—1970 (R 73) Seat Belt Hardware Test Procedures	55.9–88; 56.9–88; 57.9–88
SAE J141—1976 (R 70) Seat Belt Hardware Performance Requirements	55.9–88; 56.9–88; 57.9–88
SAE J167—1974 Protective Frame with Overhead Protection—Test Procedures and Performance Requirements.	77.403a
SAE J231—1971 Minimum Performance Criteria for Falling Object Protection Structures (FOPS).	77.403
SAE J320a—1967 (R 69; 1970 editorial change) Roll-Over Protective Structures for Rubber-Tired Self-Propelled Scrapers.	55.9–88; 56.9–88; 57.9–88; 77.403a
SAE J320b—1967 (R 72; 1972 editorial change) Roll-Over Protective Structures for Prime Movers.	55.9–88; 56.9–88; 57.9–88
SAE J333a—1968 (R 70) Operator Protection for Wheel Type Agricultural and Industrial Tractors.	55.9–88; 56.9–88; 57.9–88

SAE J334a—1968 (R 70) Protective Frame Procedure and Performance Requirements.	55.9–88; 56.9–88; 57.9–88
SAE J386—1968 Seat Belts for Construction Equipment	55.9–88; 56.9–88; 57.9–88
SAE J394—1969 (1970 editorial change) Roll-Over Protective Structures for Rubber-Tired Front-End Loaders and Rubber-Tired Dozers.	55.9–88; 56.9–88; 57.9–88; 77.403a
SAE J394a—1969 (R 72; 1972 editorial change) Roll-Over Protective Structures for Wheeled Front-End Loaders and Wheeled dozers.	55.9–88; 56.9–88; 57.9–88; 77.403a
SAE J395—1969 (1970 editorial change) Roll-Over Protective Structures for Crawler Tractors and Crawler-Type Loaders.	55.9–88; 56.9–88; 57.9–88; 77.403a
SAE J395a—1969 (R 72; 1972 editorial change) Roll-Over Protective Structures for Track-Type Tractors and Track-Type Front-End Loaders.	55.9–88; 56.9–88; 57.9–88; 77.403a
SAE J396—1969 (1970 editorial change) Roll-Over Protective Structures for Motor Graders.	55.9–88; 56.9–88; 57.9–88
SAE J396a—1969 (R 72; 1972 editorial change) Roll-Over Protective Structures for Motor Graders.	55.9–88; 56.9–88; 57.9–88; 77.403a
SAE J397—1969 Critical Zone—Characteristics and Dimensions for Operators of Construction and Industrial Machinery.	55.9–88; 56.9–88; 57.9–88; 77.403a
SAE J397a—1969 (R 72; 1973 editorial change) Deflection Limiting Volume for Laboratory Evaluation of Roll-Over Protective Structures (ROPS) and Falling Object and Protective Structures (FOPS) of Construction and Industrial Vehicles.	55.9–88; 56.9–88; 57.9–88; 77.403a
SAE J429d—1967 Mechanical and Quality Requirements for Externally Threaded Fasteners.	77.403a
SAE J429e—1969 Mechanical and Quality Requirements for Externally Threaded Fasteners.	77.403a
SAE J429f—1971 Mechanical and Quality Requirements for Externally Threaded Fasteners.	77.403a
SAE J429g—1977 Mechanical and Quality Requirements for Externally Threaded Fasteners.	77.403a
SAE J995—1967 Mechanical and Quality Requirements for Steel Nuts	77.403a
SAE J995a—1969 Mechanical and Quality Requirements for Steel Nuts.	77.403a
SAE J995b—1971 Mechanical and Quality Requirements for Steel Nuts.	77.403a
SAE J1040—1974 Performance Criteria for Roll-Over Protective Structures (ROPS) for Earth Moving, Construction, Logging, and Industrial Vehicles.	55.9–88; 56.9–88; 57.9–88

Underwriters Laboratories, Inc.

Copies of the following document are available at: MSHA Approval and Certification Center, Box 201B, Industrial Park Blvd., Triadelphia, WV 26059.

UL–198—1971 UL Standard for Alternating Current Fuses	28.40

Corps of Engineers, Department of the Army

EM–385–1–1 General Safety Requirements, 1967	55.9–88; 56.9–88; 57.9–88; 77.403a

MSHA District and Subdistrict Office Addresses

Coal Mine Safety and Health

District No. 1 Office, 20 N. Pennsylvania Ave., Wilkes-Barre, PA 18701.
District No. 2 Office, 4800 Forbes Ave., Pittsburgh, PA 15213.
District No. 3 Office, P.O. Box 886, Morgantown, WV 26505.
District No. 4 Office, P.O. Box 112, Mount Hope, WV 25880.
District No. 5 Office, P.O. Box 560, Norton, VA 24273.
District No. 6 Office, 218 High St., Pikeville, KY 41501.
District No. 7 Office, P.O. Box 572, Barbourville, KY 40906.

District No. 8 Office P.O. Box 418, Vincennes, IN 47591.
District No. 9 Office, P.O. Box 23567, Denver, CO 80225.
District No. 10 Office, P.O. Box 473, Madisonville, KY 42431.
Monroeville Subdistrict Office, 4099 William Penn Hwy., Monroeville, PA 15146.
Johnstown Subdistrict Office, Sunray and Goucher, Johnstown, PA 15905.
Mount Hope Subdistrict Office, P.O. Box 112, Mount Hope, WV 25880.
Princeton Subdistrict Office, 110 Gott Rd., Princeton, WV 24740.
Madison Subdistrict Office, P.O. Box 8, Madison, WV 25130.
Norton Subdistrict Office, P.O. Box 560, Norton, VA 24273.
Richlands Subdistrict Office, Drawer AA, Richlands, VA 24641.
Paintsville Subdistrict Office, 1568 F.M. Stafford St., Paintsville, KY 41240.
Pikeville Subdistrict Office, 218 High St., Pikeville, KY 41501.
Barbourville Subdistrict Office, 616 Manchester St., Barbourville, KY 40906.
Birmingham Subdistrict Office, 228 West Valley Ave., Birmingham, AL 35209.
Hazard Subdistrict Office, R.R. 3, Box 550–F, Hazard, KY 41701.
Benton Subdistrict Office, P.O. Box 370, Benton, IL 62812.
St. Clairsville Subdistrict Office, R.D. 6, St. Clairsville, OH 43950.
Denver Subdistrict Office, P.O. Box 23567, Denver, CO 80225.
Price Subdistrict Office, Drawer J, Price, UT 84501.
Madisonville Subdistrict Office, P.O. Box 473, Madisonville, KY 42431.
McAlester Subdistrict Office, 509 S. Third St., McAlester, OK 74501.

Metal and Nonmetal Mine Safety and Health
Northeastern District Office, 4800 Forbes Ave., Pittsburgh, PA 15213.
Southeastern District Office, 228 West Valley Ave., Birmingham, AL 35209.
North Central District Office, 228 Federal Building, Duluth, MN 55802.
South Central District Office, 1100 Commerce St., Rm. 4C50, Dallas, TX 75242.
Rocky Mountain District Office, Box 25367, Denver, CO 80225.
Western District Office, 620 Central Ave., Bldg. 7, Alameda, CA 94501.
Pittsburgh Subdistrict Office, 4800 Forbes Ave., Pittsburgh, PA 15213.
Albany Subdistrict Office, P.O. Box 1894, Albany, N.Y. 12201.
Birmingham Subdistrict Office, 228 West Valley Ave., Birmingham, AL 35209.
Knoxville Subdistrict Office, 301 West Cumberland Ave., Rm. 223, Knoxville, TN 37902.
Duluth Subdistrict Office, 228 Federal Building, Duluth, MN 55802.
Vincennes Subdistrict Office, 501 Busserson St., Vincennes, IN 47591.
Dallas Subdistrict Office, 1100 Commerce St., Rm. 4C50, Dallas TX 75242.
Rolla Subdistrict Office, 900 Pine St., Rolla, MO 65401.
Denver Subdistrict Office, Box 25367, Denver, CO 80225.
Salt Lake City Subdistrict Office, 2900 Main St., Salt Lake City, UT 84115.
Phoenix Subdistrict Office, 2721 N. Central Ave., Suite 900, Phoenix, AZ 85004.
Bellevue Subdistrict Office, 117 107th Ave., N.E., Rm. 100, Bellevue, WA 98004.

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V	Agricultural Research Service, Department of Agriculture (Parts 500-599)
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